# Costs and benefits arising from the establishment of maritime zones in the Mediterranean Sea

## Final Report


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**Disclaimer:**

This study reflects the opinions and findings of the consultants and in no way reflects or includes the views of the European Union and its Member States or any of the European Union institutions.

The research work undertaken by the consultants and the finalisation of the analysis took place between July and October 2012. Some updates have nevertheless been included in the text in order to illustrate relevant changes that have occurred beyond that period thereby providing a more complete picture. Such changes are shown in italics.


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# Acronyms and abbreviations

| | |
|---|---|
| ACCOBAMS | Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area, Monaco, 1996 |
| AIS | Automatic Identification System |
| Barcelona Convention | Convention for the Protection of the Marine Environment and Coastal Regions of the Mediterranean, 1976 as amended |
| Birds Directive | Council Directive of 2 April 1979 on the conservation of wild birds (79/409/EEC) |
| CBA | Cost benefit Analysis |
| CBD | Convention on Biological Diversity, Rio de Janeiro, 1982 |
| CDEM standards | Construction, design, equipment and manning standards |
| CEDRE | *Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles* |
| CIESM | The Mediterranean Science Commission |
| CFP | Common Fisheries Policy |
| CFP Regulation | Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy |
| CMS | Convention on the Conservation of Migratory Species of Wild Animals, Bonn, 1979 |
| CROSSMed | *Centre Régionale Opérationnel de Surveillance et de Sauvetage* |
| COLREG 72 | Convention on the International Regulations for Preventing Collisions at Sea, London, 20 October 1972, as regularly amended |
| Control regulation | Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006, OJ L 343, 22.12.2009, p 1. |
| derivative zone | Maritime zone such as EPZ or EFZ that derives from the rights of a coastal State to claim an EEZ |
| DOALOS | Division for Ocean Affairs and the Law of the Sea (UN) |
| EEZ | Exclusive Economic Zone |
| EFCA | European Fisheries Control Agency |
| EFZ | Exclusive fishing zone |
| EMSA | European Maritime Safety Agency |
| EPZ | Ecological protection zone |
| EU | European Union |
| FAO | Food & Agriculture Organization of the United Nations |
| GAIRAS | Generally accepted international rules and standards |
| GFCM | General Fisheries Commission for the Mediterranean |
| GFCM Agreement | Agreement for the establishment of the General Fisheries Council for the Mediterranean |
| Habitats Directive | Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora |
| ICCAT | International Commission for the Conservation of Atlantic Tunas |
| ICJ | International Court of Justice |
| ILO | International Labour Organisation |
| IMO | International Maritime Organisation |
| IMP | Integrated Maritime Policy |
| IMP Progress Report | Report from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the |

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| | Committee of the Regions - Progress Report on the EU's Integrated Maritime Policy |
| International Dimension Communication | Communication from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions Developing the international dimension of the Integrated Maritime Policy of the European Union |
| ITLOS | International Tribunal for the Law of the Sea |
| IUU fishing | Illegal, unreported and unregulated fishing |
| JDP | Joint deployment plan |
| LOA | Length overall |
| London Convention | Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 as amended |
| LRIT | Long-Range Identification and Tracking of Ships |
| Marine Strategy Framework Directive/MFSD | Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy |
| MARPOL 73/78 | International Convention for the Prevention of Pollution from Ships, London, 1973 as regularly amended; |
| MCS | monitoring, control and surveillance |
| Mediterranean IMP Communication | Communication from the Commission to the Council and the European Parliament -Towards an Integrated Maritime Policy for better governance in the Mediterranean |
| Mediterranean Fisheries Regulation | Council Regulation (EC) No 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94 |
| MPA | marine protected area |
| MSP | maritime spatial planning |
| MSP Achievements & Developments Communication | Communication from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Maritime Spatial Planning in the EU, Achievements and Future Development |
| NATO | North Atlantic Treaty Organisation |
| NOAA | National Oceans and |
| Pelagos Sanctuary | The Pelagos Sanctuary for Mediterranean Marine Mammals |
| PSSA | Particularly Sensitive Sea Area |
| OSPAR Convention | North Atlantic Convention for the Protection of the Marine Environment of the North-East Atlantic, 1992 |
| RFMO | Regional fisheries management organisation |
| Roadmap for maritime data sharing | Communication from the Commission to the Council and the European Parliament on a Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain |
| Roadmap for MSP Communication | Communication from the Commission - Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU |
| SAC | Special Area of Conservation (under the Habitats Directive) |
| SAR | search and rescue |
| SAR Convention | International Convention on Maritime Search and Rescue, London, 1979, as amended. |
| SOLAS 74 | The International Convention for the Safety of Life at Sea, London, 1 November 1974 as amended |
| SPA | Specially Protected Area (under the Birds Directive) |
| SPAMI | Specially Protected Area of Mediterranean Interest |
| SRS | Ship routing system |
| STCW 78 | International Convention on Standards of Training, Certification and |

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| | Watchkeeping for Seafarers, London, 1978 |
| TAC | total allowable catch |
| UfM | Union for the Mediterranean |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNESCO Convention | UNESCO Convention on the Protection of the Underwater Cultural Heritage, Paris, 2001 |
| UN | United Nations |
| UNCLOS | United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982. |
| UNCLOS III | Third United Nations Conference on the Law of the Sea |
| UN Fish Stocks Agreement | Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, New York, 1995 |
| UNEP | United Nations Environment Programme |
| VMS | Vessel monitoring system |
| VTM Directive | Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC |
| VTS | Vessel traffic service |

# 1 Introduction

On 11 September 2009 the European Commission adopted a Communication entitled 'Towards an Integrated Maritime Policy for better governance in the Mediterranean'.[1] The Communication, which was prepared within the framework of the European Union's Integrated Maritime Policy, identified a number of challenges relating to maritime governance in the Mediterranean and proposed a set of actions aimed at driving coastal States towards a more co-ordinated and holistic approach to the management of activities impacting on the sea and coastal areas.

A particular feature of the Mediterranean Sea is that unlike other semi-enclosed seas, such as the Baltic Sea or the Black Sea, many coastal States have not claimed maritime zones that they are entitled to establish under international law. Such maritime zones include contiguous zones, so-called 'contiguous archaeological zones' and Exclusive Economic Zones as well a range of maritime zones (such as fisheries zones, fisheries protection zones, ecological protection zones, ecological and fisheries protection zones) that derive from the rights of coastal States to claim Exclusive Economic Zones. The result is that large areas of the Mediterranean have, until recently at least, remained beyond the jurisdiction of coastal States and under the regime of the high seas.

As noted in the Communication of 11 September 2009 this raises particular governance issues. And the governance challenges for the Mediterranean are significant: the Communication goes on to note that the Mediterranean Sea is subject to very high pressure from economic activities witnessed *inter alia* by the fact that it bears 30% of global sea-borne traffic (including a quarter of worldwide sea-borne oil traffic), that half of the European Union (EU) fishing fleet is active there and that its coastal population of 150 million people doubles each year during the tourist season. Growing human and economic development has resulted in increased environmental degradation. Other specific challenges include security issues linked to smuggling and clandestine migration.

While seven of the Mediterranean coastal States are EU members (one is an acceding country[2], two are candidate countries[3] and two are potential candidate countries[4]) it is important to note at the outset that the declaration of maritime zones and the choice of the nature of any such claims, is a sovereign right of each State and such fundamental matters relating to the sovereignty of the Member States concerned, can only be determined by those Member States themselves pursuant to their own national priorities and in accordance with international law. The EU has no competence in the field but the choices made by EU Member States have a direct bearing on some of the EU policies, in particular, but not only, the Common Fisheries Policy and environmental policy.

The main purpose of this Study is to inform the debate over maritime governance in the Mediterranean by shedding light on the costs and benefits of establishing maritime zones in the Mediterranean in accordance with international law. In effect, the Study uses a cost benefit approach to analyse different scenarios even as regards activities that are not in themselves 'economic' activities and may necessitate a more indirect approach.

Section two of this report contains a review of the relevant provisions of international law relating to maritime zoning as well as a description of the impacts of the establishment of such zones on specific maritime activities.

[1] COM (2009) 466 of 11 September 2009.
[2] A Treaty of Accession was signed on 9 December 2011 and paves the way for the ratification procedures that will allow Croatia to become the 28th member of the European Union on 1 July 2013.
[3] Turkey and Montenegro.
[4] Albania and Bosnia & Herzegovina.

As will be seen in section three, the current situation regarding the establishment of maritime zones in the Mediterranean is, in fact, somewhat dynamic. This section contains a classification of existing maritime zones in the Mediterranean together with a description of the current situation with regard to maritime boundary delimitation as well as other types of maritime area.

Section four of this report contains an analysis of the legal impacts of the potential establishment of maritime zones in the Mediterranean in terms both of international law and EU law: the Mediterranean States that are EU members, as well as acceding, candidate and potential candidate countries, are also subject to a range of EU policies relating to the use and protection of the Mediterranean and its resources in particular and to maritime issues in general.

The analysis contained in section four sets out the basis for the cost benefit analysis which makes up the remainder of this report. The methodology is described in section five while cost benefit analysis of the main impacted areas are the subject of sections six to 11. Over-arching factors are the subject of section 12 while section 13 contains a synthesis of cost benefit indicators.

# 2 Maritime zones and the law of the sea

## 2.1 Introduction

The rights of coastal States to claim and enforce maritime zones in the Mediterranean, as elsewhere in the world, derive from the law of the sea. The law of the sea is the branch of international law that is concerned with all uses and resources of the sea. International law is the body of law that regulates the rights and duties of States and other actors, such as international organisations, recognised by international law.

The cornerstone of the law of the sea is the United Nations Convention on the Law of the Sea (hereafter referred to as 'UNCLOS')[5] and its two implementation agreements, the Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982[6] and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (the 'UN Fish Stocks Agreement').[7]

Nevertheless the ongoing importance of customary international law cannot be ignored, especially with respect to those areas of conventional law that are not clearly articulated in existing treaties or in areas where State practice may have extended the application of some treaty provisions. This phenomenon has been clearly recognized by the International Court of Justice (ICJ) in its multiple decisions on the law of the sea.[8] Customary international law also continues to play an important role in the Mediterranean given that, as will be seen, a number of coastal States are not party to UNCLOS. In this connection, though, it should be noted that most of the provisions in UNCLOS relating to maritime zones are generally considered to be declaratory of customary international law.

## 2.2 UNCLOS

Comprising 320 articles, and nine additional annexes, UNCLOS remains one of the most comprehensive international lawmaking instruments of its time.[9] UNCLOS was the outcome of the Third United Nations Conference on the Law of the Sea (UNCLOS III), which lasted from 1973 until 1982. It consolidates and replaces a number of earlier conventions on aspects of the law of the sea including, as regards maritime zones, the 1958 Convention on the Territorial Sea and Contiguous Zone[10], the 1958 Convention on the High Seas[11], the 1958 Convention on Fishing and Conservation of the Living Marine Resources of the High Seas[12] and the 1958 Convention on the Continental Shelf[13].

[5] United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982. In force: 16 November 1994, 1833 *United Nations Treaty Series* 396; <www.un.org/Depts/los>.
[6] New York, 28 July 1994. In force 28 July 1996, 33 *International Legal Materials* 1309 (1994); <www.un.org/Depts/los>.
[7] New York, 4 August 1995. In force: 11 December 2001, 2167 *United Nations Treaty Series* 3; <www.un.org/Depts/los>.
[8] Rothwell, D.R. & Stephens, T. *The International Law of the Sea*, 2010, Hart Publishing, Oxford at page 22.
[9] Rothwell, D.R. & Stephens, T. *op cit* at page 14.
[10] 29 April 1958, 516 *United Nations Treaty Series* 206.
[11] 29 April 1958, 450 *United Nations Treaty Series* 11.
[12] 29 April, 1958, 559 *United Nations Treaty Series* 285.
[13] 29 April 1958, 499 *United Nations Treaty Series* 311.

UNCLOS's overarching objective is to establish a universally accepted, just and equitable legal order - or 'Constitution'[14] - for the oceans that lessens the risk of international conflict and enhances peace and stability in the international community.[15]

As part of the legal order that it attempts to create, UNCLOS seeks to balance the rights and interests of States acting in different capacities such as flag States, coastal States, port States, geographically disadvantaged and land-locked States, as well as developed and developing States, against the interests of the international community as a whole. Such interests include international communication (e.g. navigation), the long-term sustainable use of marine living resources and the protection and preservation of the marine environment and marine biodiversity.

There are no generally accepted definitions for the terms 'coastal State' or 'port State'. For the purpose of this Study, however, the term 'coastal State' refers to a State exercising rights and jurisdiction, subject to conditions and obligations, within its maritime zones over a range of activities including the exploitation, exploration, conservation and management of natural resources, the protection and preservation of the marine environment and scientific research as well as foreign vessels.

Conversely, the term 'port State' refers to a State exercising jurisdiction, subject to conditions and obligations, over foreign vessels that are voluntarily in one of its ports. The rights, obligations and jurisdiction of a port State may, but do not necessarily, overlap with those of a coastal State (e.g. port States would have jurisdiction over illegal discharges that have occurred beyond the coastal State's maritime zones,[16] as well as over violations of conditions for entry into port).

The term 'flag State' is commonly defined as the State in which a vessel is registered and/or whose flag it flies.[17] The ascription of nationality to ships is one of the most important means by which public order is maintained at sea. As well as indicating what rights a ship enjoys, and to what obligations it is subject, the nationality of a vessel indicates which State is to exercise jurisdiction over the vessel (which may be concurrent with the jurisdiction of the coastal State in a relevant maritime zone). Nationality also indicates which State is responsible in international law for the vessel in cases where an act or omission of the vessel is attributable to the State, and also which State is entitled to exercise diplomatic protection on behalf of the vessel.[18]

Apart from specifying that there must be a 'genuine link' between the State and the vessel, UNCLOS leaves it to each State to fix the conditions for the grant of its nationality to ships, for the registration of ships in its territory, and for the right to fly its flag.[19]

[14] Remarks by Tommy Koh, Chair of UNCLOS III.
[15] See the fifth preambular paragraph to UNCLOS.
[16] See e.g. Article 218 of UNCLOS.
[17] See e.g. Article 91(1) of UNCLOS.
[18] Churchill, R.R. & Lowe, A.V. *The Law of the Sea* (Manchester, Manchester University Press: 3rd ed., 1999) at page 257.
[19] UNCLOS, Articles 91 and 92. States usually grant their nationality to vessels by means of registration and by authorising ships to fly their flag. Thus expressions such as 'the State of registration' or the 'flag State' are for almost all purposes synonyms for the State whose nationality the vessel bears. UNCLOS also provides that each State must issue to ships to which it has granted the right to fly its flag documents to that effect. In practice ships can change nationality somewhat rapidly and with relative ease and the notion of the 'genuine link' has not been widely observed in practice. In particular a number of States, known as 'flag of convenience' or 'open registry' States, permit foreign ship owners with no real connection to them to register their ships and to fly their flag. Indeed at present a large proportion of the world's commercial fleet is registered to flags of convenience.

As at 20 September 2011, there were 165 parties to UNCLOS, including the EU.[20] All of the Mediterranean coastal States are party to UNCLOS with the exception of Libya, Israel, Syria and Turkey. Syria, Turkey and Israel have neither signed nor ratified UNCLOS while although Libya signed the convention on 3 December 1984 ratification has yet to take place.

Article 310 of UNCLOS allows States and entities to make declarations or statements regarding the application of the convention at the time of signing, ratifying or acceding to it provided these do not purport to exclude or modify the legal effect of the provisions of the convention. A number of Mediterranean coastal States have made such declarations.

Finally it is important, in the context of the present Study, to make reference to Part IX of UNCLOS, which contains specific provisions on 'enclosed or semi-enclosed seas'. Article 122 defines an 'enclosed or semi-enclosed sea' to mean a gulf, basin or sea surrounded by two or more States and connected to another sea or the ocean by a narrow outlet or channel consisting entirely or primarily of the territorial seas and exclusive economic zones of two or more coastal States'. The Mediterranean Sea falls within this definition, as does the Adriatic Sea.

Article 123 of UNCLOS provides that States bordering an enclosed or semi-enclosed sea should cooperate with each other in the exercise of their rights and in the performance of their duties under the convention. It goes on to provide that such States must endeavour, directly or through an appropriate regional organization:

- to coordinate the management, conservation, exploration and exploitation of the living resources of the sea;
- to coordinate the implementation of their rights and duties with respect to the protection and preservation of the marine environment;
- to coordinate their scientific research policies and undertake where appropriate joint programmes of scientific research in the area; and
- to invite, as appropriate, other interested States or international organizations to cooperate with them in furtherance of the provisions of the article.

## 2.3 Other key conventions relating to the law of the sea in the Mediterranean

While UNCLOS, with its two implementation agreements, forms the cornerstone of the law of the sea, it is important to recognize that a large number of other international instruments and intergovernmental organizations are in various ways also part of this framework.

These include the Convention on Biological Diversity (CBD)[22] to which all Mediterranean coastal States (together with the EU) are party and which imposes obligations relating *inter alia* to the conservation of marine biodiversity.

UNCLOS also accords 'competent international organizations' a key role in the implementation and progressive development of the law of the sea. As regards the international regulation of merchant shipping, this role is accorded to the International Maritime Organization (IMO). As will be seen below, in the section on navigation and vessel

[20] Table recapitulating the status of the Convention and of the related Agreements as at 20 September 2011. Information obtained from http://www.un.org/Depts/los/reference files/status2010.pdf. *The table has since been updated and now shows that as of 30 January 2013 there were 165 parties to UNCLOS.*

[22] Convention on Biological Diversity, Nairobi, 22 May 1992. In force 29 December 1993, 31 *International Legal Materials* 822 (1992); <www.biodiv.org>.

source pollution, IMO has promoted a large number of conventions that are of relevance to this Study.

While UNCLOS and the CBD are of global application, at the regional level three particular agreements inform the law of the sea in the Mediterranean. These are the Convention for the Protection of the Marine Environment and Coastal Regions of the Mediterranean[23] (the 'Barcelona Convention'), the Agreement for the establishment of the General Fisheries Commission for the Mediterranean[24] (the 'GFCM Agreement') and the International Convention for the Conservation of Atlantic Tunas (the 'ICCAT Convention'). [25]

### 2.3.1 The Barcelona Convention

The Barcelona Convention, which was concluded within the framework of the Regional Seas Programme of the United Nations Environment Programme (UNEP), is intended to foster regional co-operation for the benefit of the marine and coastal environment. Under the Regional Seas Programme, multilateral agreements have been adopted for eight regions, including the Mediterranean, with the objective of protecting the marine environment. Most of the Regional Seas initiatives function through non-binding action plans; some however have also adopted legally binding conventions, such as the Barcelona Convention.

The Barcelona Convention applies to the 'Mediterranean Sea Area' which is described so as to include 'the maritime waters of the Mediterranean Sea, proper, including its gulfs and seas, bounded to the West by the meridian passing through Cape Spartel lighthouse, at the entrance of the Straits of Gibraltar, and to the east by the southern limits of the Straits of the Dardanelles between Mehmetcik and Kumkale lighthouses' (article 1(1)).[26] Originally adopted in 1976, the convention was amended in 1995 with the amendments entering into force on 9 July 2004.

Comprising 35 articles, the Barcelona Convention is essentially a framework convention. Although it sets out a number of general obligations (in article 4) as well as specific norms relating to certain activities (such as pollution caused by dumping (article 5), pollution from ships (article 6), pollution from land based sources (article 8), and the conservation of biodiversity (article 10)) these tend to be somewhat qualified in that the contracting parties are required to take 'appropriate measures', or to undertake measures 'as far as possible'.

Most of the detail of the legal framework created under the auspices of the Barcelona Convention is contained in a series of protocols adopted at diplomatic conferences of the contracting parties in accordance with article 21. The protocols require the contracting parties to implement their provisions in national legislation. To date the following protocols have been adopted:

- Protocol for the Prevention of Pollution in the Mediterranean Sea by Dumping from Ships and Aircraft, Barcelona, 16 February 1976 (entry into force: 12 February 1978);

[23] Originally the Convention for the Protection of the Mediterranean Sea against Pollution, Baracoa, 16 February 1976; 1102 UNTS 27.
[24] In fact the original formal name of the agreement was the 'Agreement for the establishment of the General Fisheries Commission for the Mediterranean under the provisions of Article XIV of the FAO constitution'.
[25] International Convention for the Conservation of Atlantic Tunas http://www.**iccat**.int/Documents/Commission/BasicTexts.pdf
[26] Provision is however made for the application of the convention to defined coastal areas within the territories of Contracting Parties as well as provided in Protocols to the Convention.

- Protocol Concerning Cooperation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution in the Mediterranean Sea, Malta, 25 January 2003 (entry into force: 17 March 2004);
- Protocol for the Protection of the Mediterranean Sea against pollution from Land-Based Sources and Activities, Syracuse, Italy, 7 March 1996 (entry into force: 11 May 2008);[27]
- Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean, Barcelona, 10 June 1995 (entry into force: 12 December 1999);[28]
- Protocol for the Protection of the Mediterranean Sea against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil, Madrid, 14 October 1994 (entry into force: 24 March 2011);
- Protocol on Integrated Coastal Zone Management in the Mediterranean, Madrid, 21 January 2008 (entry into force: 24 March 2011);
- Protocol on the Prevention of Pollution in the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal, Izmir, 1 October 1996 (entry into force: 19 January 2008).

### 2.3.2 The GCFM Agreement

The GFCM Agreement was originally approved within the auspices of the Food and Agriculture Organization of the United Nations (FAO) in 1949 and entered into force in 1952. A series of amendments to the original agreement were subsequently adopted the most recent of which entered into force in 2004.

The GFCM Agreement has been amended three times, in 1963, 1976 and 1997. The 1997 amendments introduced a number of important changes to the GFCM including changing the name of the former 'General Fisheries Council for the Mediterranean' to the 'General Fisheries Commission for the Mediterranean' (GFCM) as well as providing for the GFCM to operate as an autonomous body with its own budget paid for by the contracting parties (the previous iteration of the GFCM was run from within FAO).

The GFCM Agreement applies to the 'Region', which is described in its preamble as 'the Mediterranean and Black Sea and connecting waters'. In other words the GFCM Agreement does not distinguish between different types of maritime zone. All of the Mediterranean coastal States as well as the EU are party to the GFCM Agreement (although not all of the Black Sea coastal States are). Each contracting party, in other words each GFCM member, is entitled to be represented at sessions of the GFCM by one delegate (who may be accompanied by an alternate as well as experts and advisers) but, with one exception, the basic rule is that each GFCM member is entitled to one vote. An exception is made for Regional Economic Integration Organizations, such as the EU, which may exercise a number of votes equal to the number of their Member States who are also GFCM members.

The purpose of the GFCM Agreement is 'to promote the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the Region..'. To this end a number of functions and responsibilities are set out in Article III including the formulation and recommendation of appropriate measures for the conservation and rational management of living marine

[27] This protocol replaced an earlier protocol adopted on 17 May 1980 in Athens which entered into force in 1983.
[28] The annexes to this protocol were adopted in Monaco on 24 November 1996.

resources such as regulating fishing methods and fishing gear, prescribing the minimum size for individuals of specified species, establishing open and closed fishing seasons and areas and regulating the amount of total catch and fishing effort and their allocation among GFCM members.

Pursuant to Article V, such 'Recommendations' must be adopted by a two-thirds majority of the Members of the Commission present and voting. They are then binding on GFCM members, save that one member or more may, within 120 days of notification, object to a recommendation which will cease to have effect if more than one third of GFCM members also object.

### 2.3.3 The ICCAT Convention

The ICCAT Convention was established in 1966 at a Conference of Plenipotentiaries in Rio de Janeiro, Brazil and plays a key role in the regulation and management of Tuna fishing in the Mediterranean even though its spatial scope of application is much broader.

The ICCAT Convention applies to the 'Convention area', which is defined as 'all waters of the Atlantic Ocean including the adjacent seas' which means that the Mediterranean is included. It is to be noted that the ICCAT Convention applies not only to the high seas but also to the areas under the jurisdiction of the coastal States that are party to the convention. However article II of the ICCAT Convention provides that nothing in its provisions shall be considered as affecting 'the rights or views of any Contracting Party in regard to… the extent of jurisdiction over fisheries under international law'.

While the ICCAT Convention entered formally into force in 1969, the EU has been a party since 1997. Most, but not all, other Mediterranean coastal States are also party to the ICCAT Convention.[29]

The basic objective of the ICCAT Convention, as set out in its preamble, is to maintain the populations of tuna and tuna-like species within the Convention area at levels that will permit the maximum sustainable catch for food and other purposes. To this end the International Commission for the Conservation of Atlantic Tunas (ICCAT), established pursuant to the ICCAT Convention, is required to study the populations of tuna and tuna like species within the Convention area including the collection and analysis of statistical information on tuna fishery resources within the Convention area, the studying and appraisal of measures necessary to ensure the maintenance of tuna populations thus permitting maximum sustainable catch and the effective exploitation of tuna fisheries.

## 2.4 Maritime zones under UNCLOS

Part of the balance that UNCLOS seeks to achieve is accomplished by the division of the seas and oceans into maritime zones (see Figure 1 and Figure 2 below). UNCLOS recognizes the sovereignty, sovereign rights, freedoms, rights, jurisdiction and obligations of States within several maritime zones, namely 'internal waters', 'archipelagic waters' (for archipelagic States only), the 'territorial sea', the 'contiguous zone', the 'exclusive economic zone' (EEZ), the 'continental shelf', the 'high seas' and the sea bed beneath the high seas which is defined as the 'Area'[30]. A common distinction with regard to jurisdiction is that between 'prescriptive jurisdiction', whereby a State prescribes (enacts) rules and standards, and 'enforcement jurisdiction', whereby a State enforces applicable rules and standards.

[29] Non EU ICCAT parties are (with the date of accession in brackets): Morocco (1969), Libya (1995), Croatia (1997), Tunisia (1997), Algeria (2001), Turkey (2003), Syria (2005), Egypt (2007) and Albania (2008).

[30] Article 1(1)(1) of UNCLOS defines 'Area' as "the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction".

Jurisdiction is commonly restricted in terms of its spatial and substantive scope and the subjects that are covered.

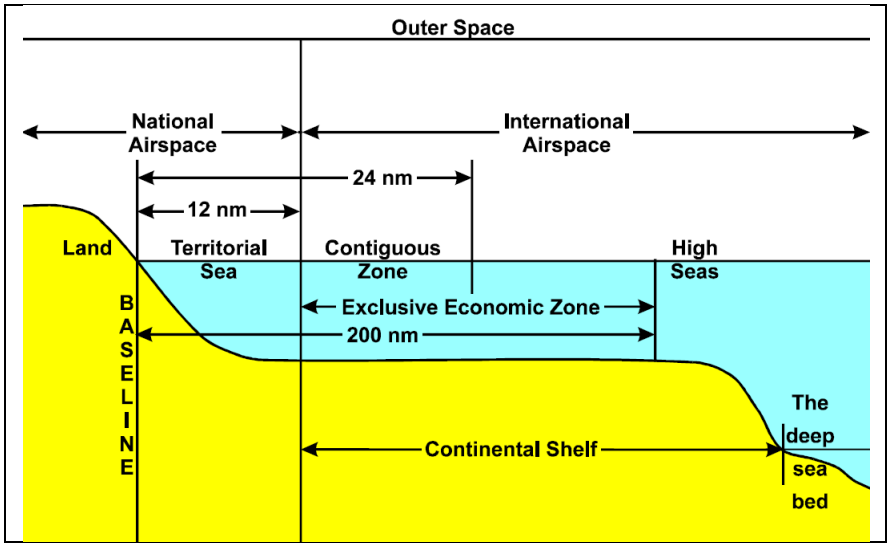


**Figure 1 Maritime zones under UNCLOS: cross section view Based on the diagram contained in R.R. Churchill and A.V. Lowe, *op*, at p. 25. Note: the figure does not show internal waters landward of baselines.**

### 2.4.1 Baselines

The starting point for the measurement of the seaward extent of all the maritime zones of a coastal State are the 'baselines', which are to be determined in accordance with UNCLOS.[31]

The 'normal' baseline is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State.[32]

Provided certain conditions are met, UNCLOS allows coastal States to draw 'straight baselines' in a number of situations, for instance where the coast "is deeply indented and cut into, or if there is a fringe of islands along the coast in its immediate vicinity" and across the mouths of rivers and bays.[33] However the drawing of straight baselines may not 'depart to any appreciable extent from the direction of the coast'. Moreover the 'sea areas lying within the lines must be sufficiently closely linked to the land domain to be the subject to the regime of internal waters'.[34]

Straight baselines are provided for in the legislation of Albania, Algeria, Croatia, Cyprus, Egypt, France, Italy, Malta, Morocco, Slovenia, Spain, and Tunisia.[35]

It is clear that there is a great diversity of state practice with regard to baselines. As baseline declarations are made unilaterally, they are only subject to protest from those States directly affected by such claims or those that are vigilant in monitoring what they consider to be excessive baseline claims, such as the United States.[36] Egypt, for example, has claimed

[31] Article 3 of UNCLOS.
[32] Article 5 of UNCLOS.
[33] Arts 7, 9 and 10 of UNCLOS.
[34] Article 7 of UNCLOS.
[35] UN DOALOS Table of claims to maritime jurisdiction (as at 15 July 2011) http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/table_summary_of_claims.pdf.
[36] Rothwell, D.R. & Stephens, T. *op cit* at page 51.

straight baselines along almost its entire coast despite the fact that it is generally smooth and undulating with few offshore or fringe islands.[37]

Finally there is the issue of historic bays, described by one commentator as 'one of the most mysterious aspects in the present international law of the sea'.[38] In outline the provisions in UNCLOS on the drawing of straight baselines across the mouths of bays are stated not to apply to 'so-called "historic" bays.[39]

In 1973 Libya made a historic bay claim relating to the Gulf of Sidra (Sirte) with a 300 nm closing line drawn within the limits of the gulf. This claim resulted in protests from a number of States including France, Norway, the UK, the United States and the then Soviet Union.[40]

Italy has drawn a 63 nm closing line across the entrance to the Gulf of Taranto that has also been subject to protests from the United States and a number of other countries.[41]

### 2.4.2 Ports and internal waters

As ports lie wholly within a State's territory, and fall on that account under its territorial sovereignty, customary international law acknowledges a port State's wide discretion in exercising jurisdiction over its ports. This was explicitly stated by the ICJ in the *Nicaragua* case where it observed that it is "by virtue of its sovereignty, that the coastal State may regulate access to its ports".[42] While there may often be a presumption that access to port will be granted, customary international law gives foreign vessels no general right of access to ports.[43]

Articles 25(2), 211(3) and 255 of UNCLOS implicitly confirm the absence of a right of access for foreign vessels to ports as well as the port State's wide discretion in exercising jurisdiction under customary international law.[44]

Internal waters lie landward of the baselines from which the territorial sea, EEZ and other seaward maritime zones are calculated. UNCLOS recognizes a coastal State's sovereignty within its internal waters within which the coastal State's authority is in principle absolute, unless restricted by international law.

Such authority encompasses complete access to, and control of, all resources as well as full jurisdiction over all activities by both nationals and foreigners, and for all purposes (e.g. safety and environmental protection).

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[37] Francalanci, G. & Scovazzi, T. 'The Old and New Egyptian Legislation on Straight Baselines' in Blake, G.H. (ed) *Maritime Boundaries* (London, Routledge, 1994) cited in Rothwell, D.R. and Stephens, T. *op cit* at page 50. Nevertheless, the Egyptian straight baseline claim does not appear to have hindered the conclusion of the delimitation of its EEZ with Cyprus.

[38] Scovazzi, T. 'Book Review of Clive R. *Historic waters in the Law of the Sea – A Modern Re-Appraisal*' in25 *International Journal of Marine & Coastal Law* 4 December 2010 at page 637.

[39] Article 10(6) of UNCLOS. This wording essentially restates Article 7(6) of the 1958 Convention on the Territorial Sea and the Contiguous Zone.

[40] Churchill, R.R. & Lowe, A.V. *op cit* at page 45.

[41] Rothwell, D.R. & Stephens, T. *op cit* at page 49.

[42] Case concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America), Judgment of 27 June 1986, *ICJ Reports* 1986, p. 14, at p. 111, para. 213.

[43] Cf. A.V. Lowe, "The Right of Entry into Maritime Ports in International Law", 14 *San Diego Law Review* 597-622 (1977), at p. 622.

[44] Article 211(3) of UNCLOS explicitly acknowledges the right of port States to prescribe – individually or in concert - more stringent standards than generally accepted international rules and standards (GAIRAS).

One example of a restriction on a coastal State's authority within its internal waters is contained in Article 8(2) of UNCLOS, which provides:

> Where the establishment of a straight baseline in accordance with the method set forth in article 7 has the effect of enclosing as internal waters areas which had not previously been considered as such, a right of innocent passage as provided in this Convention shall exist in those waters.

### 2.4.3 Archipelagic waters

Before their incorporation into Part IV of UNCLOS, which is entitled 'Archipelagic States', the terms 'archipelagic State' and 'archipelagic waters' were both relative novelties for the law of the sea. The term 'archipelagic State' is defined in Article 46(a) of UNCLOS as "a State constituted wholly by one or more archipelagos and may include other islands". The term 'archipelago' is defined in paragraph (b) as:

> a group of islands, including parts of islands, interconnecting waters and other natural features which are so closely interrelated that such islands, waters and other natural features form an intrinsic geographical, economic and political entity, or which historically have been regarded as such.

It is clear that the general nature of these definitions is unable to give adequate guidance in many scenarios.

Article 46(a) nevertheless makes it clear that groups of islands situated off - either distant or nearby - States on the 'mainland' or 'continent' are excluded from the scope of Part IV.[45]

[45] Cf. S.N. Nandan, S. Rosenne (vol. eds.) and M.H. Nordquist (ed.-in-chief), *United Nations Convention on the Law of the Sea 1982, A Commentary, Volume II* (Dordrecht/Boston/London, Martinus Nijhoff Publishers: 1993), at p. 403. Churchill and Lowe, *op cit*, at p. 120 agree but submit that this "seems an unnecessary and unreasonable restriction". This provision explains why neither Croatia nor Greece have claimed the status of archipelagic States notwithstanding the not uncommon description of their many islands as 'archipelagos' in ordinary language.

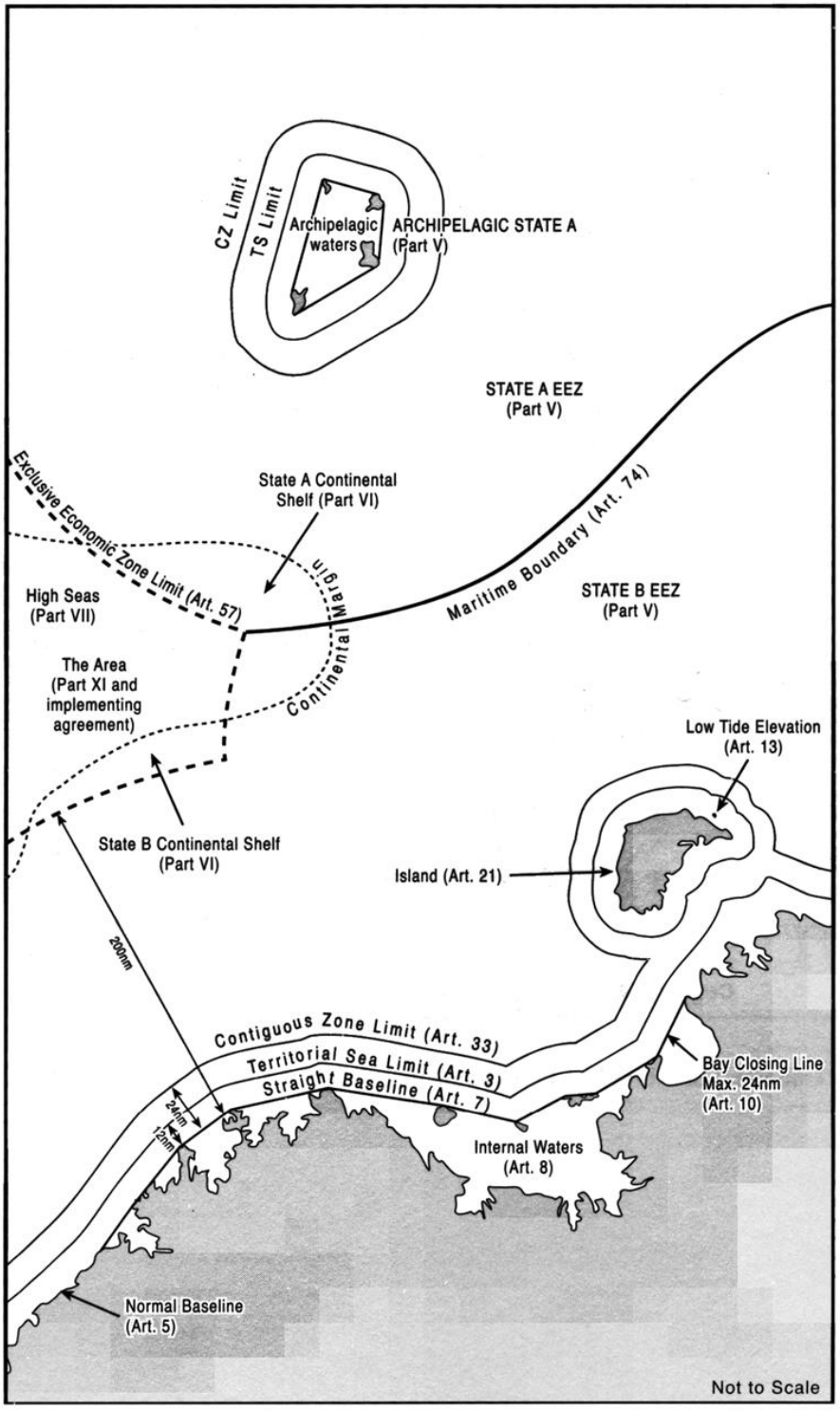


**Figure 2 Maritime Zones under UNCLOS: overhead view. Source: V. Prescott and C. Schofield, *The Maritime Political Boundaries of the World* (Leiden/Boston, Martinus Nijhoff Publishers: 2nd ed., 2005), at p. 548.**

Neither of the two island States in the Mediterranean, Cyprus and Malta, have claimed archipelagic status.[46]

[46] UN DOALOS Table of claims to maritime jurisdiction (as at 15 July 2011) http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/table_summary_of_claims.pdf.

### 2.4.4 Territorial sea

The sovereignty of a coastal State extends beyond its land territory and internal waters to an adjacent belt of sea described as the territorial sea. The maximum breadth of the territorial sea is twelve nautical miles (nm)[47] measured from the baselines.

Within the territorial sea the authority of the coastal State is in principle absolute except as restricted by UNCLOS and other rules of international law. The most important restriction included in UNCLOS is the right of 'innocent passage' through the territorial sea. This right is enjoyed by ships of all States.[48]

Articles 18 and 19 of UNCLOS focus on the modalities and innocence of passage. 'Passage' means navigation through the territorial sea for the purpose of: (a) traversing that sea without entering internal waters or calling at a roadstead or port facility outside the internal waters; or (b) proceeding to or from internal waters or calling at such roadstead or port facility. With limited exceptions such passage must in principle be 'continuous and expeditious'.[49] Passage remains 'innocent' as long as it is not prejudicial to the peace, good order and security of the coastal State. Paragraph (2) of Article 19 contains a non-exhaustive list of activities that would render passage non-innocent including "any act of willful and serious pollution contrary to this Convention".

The broad jurisdiction of coastal States in their territorial sea is reflected in the non-exhaustive list of regulatory purposes incorporated in Article 21(1), subparagraph (a) of which reads "the safety of navigation and the regulation of maritime traffic" and subparagraph (f) "the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof". Ships exercising the right of innocent passage must comply with the laws and regulations made applicable to the territorial sea by the coastal State in accordance with UNCLOS.

As a safeguard to flag States, Article 24(1) provides that a coastal State may not hamper the innocent passage of foreign ships through its territorial sea except in accordance with the provisions of UNCLOS. It goes on to provide that in the application of UNCLOS or any laws or regulations adopted in conformity therewith, the coastal State shall not:

> (a) impose requirements on foreign ships which have the practical effect of denying or impairing the right of innocent passage; or
> (b) discriminate in form or in fact against the ships of any State or against ships carrying cargoes to, from or on behalf of any State.

Article 26(1) of UNCLOS stipulates that no charges may be levied on foreign ships by reason only of their passage through the territorial sea. Article 26(2) provides that such charges may be levied in a non-discriminatory manner 'as payment only for specific services rendered to the ship'.

UNCLOS contains a separate regime to ensure that straits used for international navigation are not subject to the same regime of innocent passage that applies in the territorial sea, even though they would be included in the territorial sea due to the expansion of their breadth to 12 nm. This regime is laid down in UNCLOS's Part III entitled 'Straits Used for International Navigation'.

[47] 1 nm = 1,852 metres.
[48] Article 17 of UNCLOS.
[49] Article 18 of UNCLOS.

Examples in the Mediterranean of straits used for international navigation include the Corfu Channel (which lies between the Greek island of Corfu and Albania) and the Straits of Bonifaccio (between Sardinia and Corsica).

In comparison with the regime of innocent passage, the regime of transit passage considerably constrains the legislative and enforcement jurisdiction of coastal States and considerably relaxes the modalities of passage for foreign vessels and the stringency of the standards that are to be complied with. Among other things, Part III does not contain a provision comparable to Article 25(1), which confirms the coastal State's power "to prevent passage which is not innocent", or a list of activities comparable to the list in Article 19(2), which render passage non-innocent.

### 2.4.5 Contiguous zone

Article 33(1) of UNCLOS provides that within a zone contiguous to its territorial sea, described as the 'contiguous zone', a coastal State may exercise the control necessary to: (a) prevent infringements of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea; and (b) to punish violations of the laws and regulations committed within the territorial sea and areas landward.[50]

The maximum outer limit of the contiguous zone may not exceed 24 nm from the baselines. Contiguous zone jurisdiction is specifically related to the outward and inward bound movement of ships.

### 2.4.6 'Archaeological contiguous zone'

Article 303(2) of UNCLOS provides that in order to control traffic in archaeological and historical objects found at sea, a coastal State that has claimed a contiguous zone may presume that the unauthorised removal of such objects from its contiguous zone 'would result in an infringement within its territory or territorial sea of the laws and regulations referred to in that article'.

While the wording of this article may be considered less than optimal (given that: (a) the laws and regulations referred to in Article 33 would ordinarily be expected to relate to customs, fiscal, immigration or sanitary matters in connection with the functioning of a contiguous zone and not to the protection of archaeological objects; and (b) that it refers only to their removal and not to their destruction) the intention of Article 303(2) appears to be that a coastal State can establish a 24 mile archaeological zone in which it can apply its legislation for the aim of protecting relevant archaeological objects.[51] It should be noted that the term 'archaeological contiguous zone' does not actually appear in UNCLOS.

### 2.4.7 Exclusive economic zone and derivative zones

Beyond its territorial sea a coastal State may claim an exclusive economic zone (EEZ) that may extend up to 200 nm from the baseline.

In contrast to the territorial sea, in respect of which a coastal State has sovereignty, a more limited set of "sovereign rights" are conferred by UNCLOS on coastal States in respect of EEZs claimed.

[50] Article 33 of UNCLOS.
[51] Scovazzi, T. 'The Protection of the Underwater Cultural Heritage: Article 303 and the UNESCO Convention' in Freestone, D., Barnes, R. & Ong, D. *The Law of the Sea – Progress and Prospects*, OUP, Oxford 2009 at page 123.

More specifically, within its EEZ a coastal State has sovereign rights relating to living and non-living resources and with regard to other activities for the economic exploitation and exploration of its EEZ, such as the production of energy. Article 56(1) states that:

> In the exclusive economic zone, a coastal State has:
>
> (a) sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;

A coastal State also has the necessary jurisdiction related to these sovereign rights as well as jurisdiction for the establishment and use of artificial islands, installations and structures, marine scientific research and the protection and preservation of the marine environment.[52]

These sovereign rights and jurisdiction conferred upon the coastal State imply the power to regulate the terms of use relating to those activities. On the other hand the coastal State does not enjoy sovereignty in the fullest sense. Article 56(2) of UNCLOS states:

> In exercising its rights and performing its duties under this Convention in the exclusive economic zone, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of this Convention.

In other words coastal State regulatory competence in the EEZ is not plenary, but confined to the matters expressly indicated in UNCLOS in respect of which sovereign rights or jurisdictional powers are granted to a coastal State. Moreover UNCLOS subjects the exercise of this competence to various conditions and obligations explicitly foreseen, such as the right of any State to lay submarine pipelines and cables, and the freedom of navigation of other States' vessels.[53]

The construction of artificial islands, installations and structures in the EEZ is subject to the specific provisions contained in Article 60 of UNCLOS. This article provides:

> 1. In the exclusive economic zone, the coastal State shall have the exclusive right to construct and to authorize and regulate the construction, operation and use of:
> (a) artificial islands;
> (b) installations and structures for the purposes provided for in article 56 and other economic purposes;
> (c) installations and structures which may interfere with the exercise of the rights of the coastal State in the zone.
> 2. The coastal State shall have exclusive jurisdiction over such artificial islands, installations and structures, including jurisdiction with regard to customs, fiscal, health, safety and immigration laws and regulations.

Article 60 of UNCLOS goes on to authorise the coastal State to take precautionary measures as regards the safety of navigation. These are described in more detail below in the section relating to navigation.

States are free to claim an EEZ of lesser breadth than 200 nm and also to assert less than the full complement of rights afforded by the EEZ regime.[54]

[52] UNCLOS Article 56(1)(b).
[53] Note that freedom of navigation in the EEZ is not absolute, but a balancing exercise between the coastal State and the flag State, inasmuch as by UNCLOS Article 58(3) its exercise is subject to due regard to the coastal State's rights and duties and compliance with its laws in so far as they are not incompatible with Part V of the Convention.
[54] Rothwell, D.R. & Stephens, T. *op cit* at page 85.

The 'fishery zones', 'fisheries protection zones', 'ecological protection zones' and 'ecological and fishery protection zones' have been claimed by a number of Mediterranean coastal States, and which are discussed in greater detail below, can therefore in terms of UNCLOS be understood to amount to a sub-category of EEZ. Because such zones derive from the rights conferred on coastal States to claim an EEZ, in this report they are described as 'derivative zones'. In those cases where a coastal State does not claim its full complement of substantive rights, the maritime area remains part of the high seas, and thus subject to the rules applying to the high seas, discussed below, in respect of those activities pertaining to those unclaimed rights.

One problem in discussing derivative zones is that the names used are not formally recognised as such in international law: they are not 'terms of art'. Thus it is up to each coastal State to specify, in accordance with its own procedures (see Section 2.5 below), precisely which specific rights it is claiming in terms of the establishment of a derivative zone: this will usually be the item of national legislation that provides for the establishment of the relevant zone. Moreover the name used need not necessarily be indicative of the precise bundle of rights claimed. For example article 2 of the Italian law providing for the establishment of an 'ecological protection zone'[55] states that within such a zone Italy has jurisdiction with regard not only to the protection of the marine environment but also with regard to archaeological and historical artefacts in conformity with relevant international conventions.[56] It is possible, therefore, to conceive of a situation in which, for example, the bundle of rights claimed in neighbouring 'ecological zones' might actually be different depending on whether or not a broad or narrow notion of ecology is used (capture fishing, for example, has an evident ecological impact).

In this connection, in terms of its national laws, a coastal State can obviously only assert those rights that it has formally claimed in its legislation. Thus, for example, a coastal State that has claimed, say, an 'ecological protection zone', and adopted legislation accordingly that addresses strictly environmental issues but which does not in any way address fisheries issues, cannot without more assert rights over fisheries resources in that zone. Of course in practice much will depend on the precise wording of the instrument creating an ecological protection zone and in any event by claiming only an ecological protection zone a coastal State is not precluded from subsequently also claiming, say, a fisheries protection zone or even a full EEZ. Clearly though a coastal State may not claim more than the complement of rights available within the EEZ regime.

As noted in the introduction to this report the decision whether or not to claim an EEZ or derivative zone is the sovereign right of a coastal State.

### 2.4.8 Continental shelf

UNCLOS's Part VI entitled 'Continental Shelf' contains the regime for the continental shelf. Article 76(1) of UNCLOS provides:

> The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.

In other words some, but not all, coastal States may be entitled to an outer continental shelf that extends beyond the maximum outer limit of their EEZs, in other words beyond 200 nm

[55] *Legge 8 febbraio 2006 no. 61 Instituzione di protezione ecologica oltre il limite esterno del mare territoriale.*
[56] In fact the UNESCO Convention described in more detail below.

from the baselines. In the Mediterranean Sea, however, the notion of the extended continental shelf is not an issue: the sea is simply too narrow and continental shelf entitlements do not even extend to the full 200 nm.

With regard to its continental shelf, Article 77(1) of UNCLOS provides that a coastal State exercises 'sovereign rights for the purpose of exploring it and exploiting its natural resources'. In other words, as with the rights of a coastal State over its EEZ, something less than full sovereignty is conferred.

Article 77 (2) goes on to clarify that the rights of the coastal State are exclusive in that if it does not explore its continental shelf or exploit its natural resources no one else may undertake such activities without the express consent of the coastal State.

Unlike the EEZ, the coastal State gains its continental shelf by operation of law, without the need to claim it.[57]

The sovereign rights of the coastal State regarding the continental shelf include the exploitation of living organisms belonging to 'sedentary species' (which are defined as organisms, which at the harvestable stage, are either 'immobile, on or under the sea-bed or are unable to move except in constant physical contact with the sea-bed or the subsoil') drilling, tunnelling, and the use of artificial islands, installations, and structures. It follows that coastal States may also take the appropriate planning measures to regulate these activities.

Article 78(1) of UNCLOS states that:

> The rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters or of the air space above those waters.

Thus in the absence of an EEZ claim or similar, the coastal State has no rights with regard to the waters over the sea-bed and the airspace above those waters, which have the status of high seas. Except to the extent necessary to make use of its economic rights on the continental shelf, a coastal State must avoid interference with navigation and other rights and freedoms of other States as laid down in the regime of the high seas.[58]

A coastal State is entitled to a continental shelf of 200 nm even if it has chosen not to establish an EEZ (or a derivative zone).

As regards artificial islands, installations and structures on the continental shelf, Article 80 of UNCLOS states that article 60 applies *mutatis mutandis.* In other words the coastal State is authorised to take precautionary measures as regards the safety of navigation.

### 2.4.9 High seas

Beyond the outer limit of the EEZ or derivative zone (or of the territorial sea if no EEZ or derivative zone has been declared) the regime of the high seas applies.[59]

Rather than offering a definition for the term 'high seas', UNCLOS defines the spatial scope of application of its Part VII entitled 'High Seas' in Article 86, as follows:

[57] UNCLOS Article 77(3).
[58] UNCLOS, Article 78(2).
[59] To be more specific, in the case of a coastal State that has not claimed a contiguous zone, an EEZ or a derivative zone, the regime of the high seas begins beyond the outer limit of the territorial sea. If a coastal State has claimed one of these zones, the regime of the high seas in those zones will be subject to the rights of the coastal State within such zones.

> The provisions of this Part apply to all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State.

All States enjoy the freedom of the high seas. Article 87 defines the scope of this freedom, stipulating that:

> 1. It comprises, inter alia, both for coastal and land-locked States:
>
> (a) freedom of navigation;
> (b) freedom of overflight;
> (c) freedom to lay submarine cables and pipelines, subject to Part VI;
> (d) freedom to construct artificial islands and other installations permitted under international law, subject to Part VI;
> (e) freedom of fishing, subject to the conditions laid down in section 2;
> (f) freedom of scientific research, subject to Parts VI and XIII.
>
> 2. These freedoms shall be exercised by all States with due regard for the interests of other States in their exercise of the freedom of the high seas, and also with due regard for the rights under this Convention with respect to activities in the Area.

The limits to this freedom are laid down in Article 89 of UNCLOS, which states that '(N)o State may validly purport to subject any part of the high seas to its sovereignty'. In other words States are not entitled to exercise jurisdiction in a coastal State capacity with respect to the high seas,[60] which is for that reason also referred to as an 'area beyond national jurisdiction' or an 'international commons'.

Within the high seas, all States are entitled to exercise the freedoms that also exist in the EEZ and, in addition, the freedoms of fishing, marine scientific research and to construct artificial islands and other installations. These freedoms are all subject to conditions and obligations.[61] As regards the freedom of navigation, mention can be made of UNCLOS's obligations for flag States, which are often linked to IMO rules and standards.

### 2.4.10 The Area

Article 1(1)(1) of UNCLOS defines the term 'Area' as the "seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction". In addition to the high seas, the Area can also be classified as an 'area beyond national jurisdiction' where States are not entitled to exercise jurisdiction in a coastal State capacity.[62]

Key-features of UNCLOS's regime for the Area are the principle of the common heritage of mankind and the International Seabed Authority. For the purpose of this Study, however, the regime of the Area does not warrant further discussion as the entire seabed of the Mediterranean is subject to continental shelf claims.

[60] Article 89 of UNCLOS stipulates "No State may validly purport to subject any part of the high seas to its sovereignty.
[61] Article 87(1) of UNCLOS.
[62] See Article 137 of UNCLOS.

## 2.5 The establishment of and delimitation of maritime zones

Although UNCLOS contains relatively detailed provisions on the establishment and delimitation of maritime zones, it does not specify precisely how this is to be done.[63] This is because the entire procedure takes place at the interface between international law and national law. More specifically, although the establishment and delimitation of maritime zones takes place under international law, the actual legal mechanisms for doing so are generally those of the national legislation of the State concerned.

Typically the first formal stage is for a coastal State to adopt relevant primary legislation in the form of a law or act of parliament providing for the establishment of a particular maritime zone as a matter of national law. This can be done through separate laws for each type of maritime zone as appropriate or through a framework law on maritime zones or even, as in the case of Croatia, in the Navigation Code.[64]

Subsequently, though, the actual establishment of maritime zones usually depends on the adoption of subordinate legislation (in the form of a decree, ordinance, rule or regulation depending on practice in the jurisdiction concerned) that identifies the boundaries of relevant maritime zones, sometimes many years after the adoption of the relevant primary legislation. Subordinate legislation may determine the boundaries of such zones on a provisional or final basis. Because, in the Mediterranean it is necessary to determine maritime boundaries with adjacent and/or opposite states, national legislation typically provides for these boundaries to be negotiated accordingly. Sometimes the national legislation specifies the basis on which such boundaries are to be negotiated.

### 2.5.1 Principles for the delimitation of the boundaries of maritime zones

The boundaries of maritime zones always have to be delimited between adjacent States. In the Mediterranean such boundaries also fall to be delimited between opposite States in those cases where the maximum widths of maritime zones would otherwise overlap. This is always the case as regards continental shelf and EEZ boundaries in the Mediterranean but in a number of cases territorial sea boundaries must also be determined between opposite States.

The principles for the delimitation of maritime boundaries are set out in UNCLOS. As regards territorial sea boundaries the basic provisions are contained in Article 15, which provides as follows:

> Where the coasts of two States are opposite or adjacent to each other, neither of the two States is entitled, failing agreement between them to the contrary, to extend its territorial sea beyond the median line every point of which is equidistant from the nearest points on the baselines from which the breadth of the territorial seas of each of the two States is measured. The above provision does not apply, however, where it is necessary by reason of historic title or other special circumstances to delimit the territorial seas of the two States in a way which is at variance therewith.

The provisions on the delimitation of the EEZs between States with opposite or adjacent coasts contained in article 74 of UNCLOS are identical to with those of article 83 relating to the delimitation of the continental shelf.

[63] Article 3 of UNCLOS, for example, simply states that every State 'has the right to establish the breadth of its territorial sea up to a limit not exceeding 12 (nm)..'.

[64] See further Papanicolopulu, I. "A Note on Maritime Delimitation in a Multizonal Context: The Case of the Mediterranean", (2007) 38 *Ocean Development and International Law* 381 at page 10.

Delimitation is to take place by agreement on the basis of international law in order to achieve an 'equitable solution'. In other words there is no specific reference to equidistance or for that matter 'equitable principles'.

In the recent (2009) Black Sea case between Romania and Ukraine the ICJ, for the first time, set out its 'delimitation methodology' which, in accordance with its 'settled jurisprudence', comprises a three-stage process. The first stage is the establishment of a provisional delimitation line, which in the case of opposite coasts will be the median line and in the case of adjacent coasts will be the equidistance line. The next stage in the delimitation process is to consider whether there are any factors that call for an adjustment of the provisional line in order to achieve an equitable result. The third and final stage is to verify that the adjusted provisional line does not lead to an inequitable result 'by reason of any marked disproportion between the ratio of the respective coastal lengths and the ratio between the relevant maritime area of each State by reference to the delimitation line'.[65]

Although there is an increasing tendency among States to favour a single maritime boundary (as was the case in the Black Sea case) and although the principles for delimiting EEZ claims can be assumed to be similar to those apply in respect of continental shelf delimitation there may in practice be some differences in balancing equitable factors.

In other words it not necessarily the case that EEZ boundaries will directly over-lie continental shelf boundaries, although this may be considered the more usual outcome. This is particular likely to be the case where EEZ boundaries are de-limited sometime after continental shelf boundaries. In the context of the Mediterranean long-established continental shelf boundaries may not necessarily be the same as the boundaries of EEZs (and derivative zones). For example, as will be seen, Italy has rejected the agreed continental shelf boundary with Croatia as the being also the basis for the outer limit of Croatia's claimed Ecological and Fishery Protection Zone. In the case of the Mediterranean these boundaries have been the subject of an earlier review.[66]

### 2.5.2 Boundary delimitation procedure

In practice, the delimitation of maritime boundaries, is often be reached by agreement, through negotiations. If agreement on the delimitation of maritime boundaries cannot be reached 'within a reasonable period of time' the parties must resort to the dispute resolution procedures set out in Part XV of the Convention unless there is any specific treaty in force between the relevant States that addresses the issue. [67]

These may include procedures entailing non-binding decisions (such as exchange of views, good offices, mediation, enquiry and conciliation) or procedures entailing binding decisions (such as procedures before the ICJ, the International Tribunal for the Law of the Sea (ITLOS) or an arbitral tribunal).

Maritime boundary delimitation is invariably a politically sensitive process, particularly when involving opposite coasts less than 400 nm apart as is the case in the Mediterranean. While boundary delimitation by States on the basis of negotiations may take into account political and other considerations, delimitations under dispute resolution procedures before such *fora*

[65] Maritime Delimitation in the Black Sea (Romania v. Ukraine), Judgment, I.C.J. Reports 2009, p. 61 http://www.icj-cij.org/docket/files/132/14987.pdf at page 122.
[66] Revue de les Zones Maritimes en Mediterranee. Revue de l' INDEMER (2001), Actes du Colloque no 6; Institut du Droit Economique de la Mer, Monaco 184pp
[67] UNCLOS Article 74.

as the ICJ, ITLOS and arbitral tribunals must be based on considerations of law and the application of equitable criteria.[68]

As UNCLOS Article 74, paragraph 3, emphasizes, pending a final agreement, the States concerned "shall make every effort to enter into provisional arrangements of a practical nature."

### 2.5.3 Deposit with the United Nations and other steps to be taken

Once the process of establishing and delimiting maritime zones is complete, some mechanism is necessary in terms of international law for ensuring that States, seafarers and others can be made aware of the scope and existence of such zones. To this end Article 16 of UNCLOS requires the preparation of either: (a) charts of an appropriate scale that show both the baselines and the limits of the territorial sea; or (b) a list of geographic coordinates specifying the geodetic datum. Coastal States must give due publicity to such charts or lists of coordinates and must also deposit copies with the Secretary General of the United Nations. Within the United Nations Secretariat the responsibility for managing such documents lies with the Division for Ocean Affairs and the Law of the Sea (DOALOS), of the Office of Legal Affairs, United Nations Secretariat.

While no equivalent obligation is imposed as regards contiguous zones, UNCLOS contains similar provisions as regards the EEZ and continental shelf outer boundaries. Logic would suggest that similar deposits should be made where fisheries zones, ecological zones and other derivative zones are established.

Such data, along with national maritime zone legislation notified to the UN, is periodically published in the *Law of the Sea Bulletin* and on the UN website.[69]

It is however doubtful that a State's failure to make such a deposit has any legal impact on the validity of such zones/boundaries. Many States, including Mediterranean States, have yet to deposit the relevant documents.

Finally, having established a maritime zone in accordance with the rules and procedures of international law, a coastal State will need to ensure that its existing national legislation is actually expressed to apply as a matter of national law within such zones. For example it may be necessary to extend the scope of fisheries legislation beyond the territorial sea and into the new EEZ or derivative zone.

## 2.6 The legal impacts of maritime zones on maritime activities

Having described the substance of maritime zones under UNCLOS, and the procedures whereby these are claimed, the next question is what impacts do the existence or otherwise of maritime zones have on different maritime activities in terms of the law of the sea?

[68] See further Noussia, K. 'On International Arbitrations for the Settlement of Boundary Maritime Delimitation Disputes and Disputes from Joint Development Agreements for the Exploitation of Offshore Natural Resources' in 25 *International Journal of Maritime and Coastal Law* 25 (2010) pp 63-80.

[69] http://www.un.org/Depts/los/index.htm

### 2.6.1 Safety of navigation and vessel source pollution

The safety of navigation and vessel source pollution are intimately linked: if there is a collision or a vessel sinks marine pollution is quite likely to result. As a framework convention, UNCLOS does not itself set out binding rules regarding the safety of navigation but confines itself to stating where the authority to make such rules lies.

In the EEZ and on the high seas it incorporates by reference the rules made by what it refers to as the "competent international organization" namely the International Maritime Organization (IMO).[70] IMO's overall mandate relates to: (i) vessel-source pollution; (ii) maritime safety; and (iii) maritime security.

Within the auspices of IMO, a wide range of binding and non-binding instruments have been adopted. Of these, the most important binding instruments include:

- The Convention on the International Regulations for Preventing Collisions at Sea, London, 20 October 1972 (COLREG 72) In force 15 July 1977, as regularly amended;[71]
- The International Convention for the Prevention of Pollution from Ships, London, 2 November 1973, as modified by the 1978 Protocol (London, 1 June 1978) (MARPOL 73/78) and the 1997 Protocol (London, 26 September 1997) and as regularly amended;[72]
- The International Convention for the Safety of Life at Sea, London, 1 November 1974 (SOLAS 74);[73]
- The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, London, 1 December 1978;[74]
- The International Convention on the Control of Harmful Anti-fouling Systems on Ships, London, 5 October 2001;[75]
- The International Convention for the Control and Management of Ships' Ballast Water and Sediments, London, 13 February 2004 (BWM Convention);[76]
- The International Convention on Oil Pollution Preparedness, Response and Co-operation, London, 30 November 1990. In force 13 May 1995;[77]
- The Protocol on Preparedness, Response and Co-operation to Pollution Incidents by Hazardous and Noxious Substances, London, 15 March 2000 (2000 HNS Protocol). In force 14 June 2007, IMO Doc;[78]
- The International Convention on Civil Liability for Oil Pollution Damage, Brussels, 29 November 1969. In force 19 June 1975;[79]
- The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, Brussels, 18 December 1971. In force 16 October 1978;[80]

[70] Although not named as such, the IMO is universally regarded as the body meant by this phrase.
[71] 1050 *United Nations Treaty Series* 16.
[72] 1340 *United Nations Treaty Series* 62.
[73] 1184 *United Nations Treaty Series* 278.
[74] 1361 *United Nations Treaty Series* 190. In force 28 April 1984, as amended and modified by the 1995 Protocol.
[75] In force 17 September 2008, IMO Doc. AFS/CONF/26, of 18 October 2001.
[76] Not in force, IMO Doc. BWM/CONF/36, of 16 February 2004.
[77] 30 *International Legal Materials* 733 (1990).
[78] HNS-OPRC/CONF/11/Rev.1, of 15 March 2000.
[79] 9 *International Legal Materials* 45.
[80] 11 *International Legal Materials 284*.

- The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea, London, 3 May 1996. Not in force;[81]
- The International Convention on Civil Liability for Bunker Oil Pollution Damage, London, 23 March 2001. In force 21 November 2008.[82]

As regards non-binding instruments, the Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas (the PSSA Guidelines), considered below, are of relevance to this Study.[83]

All of these legally binding and non-legally binding instruments have a global scope of application. Nevertheless, in varying ways most of other these instruments also allow for the adoption of more stringent measures in specified geographical areas. This is very explicit for MARPOL 73/78 which contains discharge and emission standards, in addition to construction, design, equipment and manning standards.

The international legal regime for the regulation of maritime shipping contains a wide number of categories of standards. For the purpose of this Study, however, the following main categories of substantive standards or requirements are distinguished[84]:

- discharge and emission standards, including standards relating to ballast water exchange;
- construction, design, equipment and manning (CDEM) standards, including fuel content specifications and ballast water treatment requirements;
- navigation standards, in the form of ships' routing measures, SRSs and VTSs;
- contingency planning and preparedness standards; and
- liability, compensation and insurance standards.

In addition, while the bulk of these standards and requirements apply directly to individual vessels, certain instruments also apply on a spatial basis i.e. to particular maritime areas. These instruments are considered in more detail below in the section on marine protected areas.

Most of the provisions in UNCLOS on vessel-source pollution are laid down in its Part XII, entitled 'Protection and Preservation of the Marine Environment'. This part begins with Section 1, entitled 'General Provisions' and applies to all sources of pollution. Its first provision - Article 192 - lays down the general obligation for all States - in whatever capacity therefore - "to protect and preserve the marine environment". This is elaborated in Article 194 with regard to measures to prevent, reduce and control pollution of the marine environment; aimed specifically at vessel-source pollution in paragraph (3)(b). Other relevant general obligations relate to rare or fragile ecosystems and the habitat of endangered species (Article 194(5-, introduction of alien species (Article 196), co-operation on a global or regional basis (Article 197), contingency plans against pollution (Article 199), monitoring of the risks or effects of pollution (Article 204) and assessment of potential effects of activities (Article 206). Sections 5 and 6 contain separate provisions on prescription and enforcement for each of the sources of pollution.

[81] 35 *International Legal Materials* 1415.
[82] *OJ L 256/7* (2002).
[83] IMO Assembly Resolution A.982(24), of 1 December 2005, 'Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas' (IMO doc. A 24/Res.982, of 6 February 2006),
[84] This categorization is merely meant to facilitate discussion and does not capture the entire spectrum of types of standards or requirements developed within IMO or applied by individual States acting in their various capacities.

The jurisdictional framework relating to vessel-source pollution laid down in UNCLOS is predominantly aimed at flag States and coastal States. Apart from one explicit provision (Article 218), port State jurisdiction is only implicitly dealt with.

As a general rule, prescriptive jurisdiction by flag and coastal States is linked by means of rules of reference to the notion of 'generally accepted international rules and standards' (GAIRAS). These refer to the technical rules and standards laid down in instruments adopted by regulatory organizations, in particular IMO. It is likely that the rules and standards laid down in legally binding IMO instruments that have entered into force can at any rate be regarded as GAIRAS.[85]

UNCLOS stipulates that flag State prescriptive jurisdiction over vessel-source pollution is mandatory and must have at least the same level as GAIRAS.[86] Flag States can therefore choose to require their vessels to comply with more stringent standards than GAIRAS. Conversely, coastal State prescriptive jurisdiction over vessel-source pollution is optional under UNCLOS but, if exercised, cannot be more stringent than the level of GAIRAS.[87] This is the general rule even though it is subject to some exceptions (see below).

It should also be noted that this general rule only relates to pollution of the marine environment by vessels. The term 'pollution of the marine environment' is defined in Article 1(1)(4) of UNCLOS as

> the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

Finally, reference should be made to Part XII's penultimate Section 10, entitled 'Sovereign Immunity' which contains a single provision with the same title. It reads

> The provisions of this Convention regarding the protection and preservation of the marine environment do not apply to any warship, naval auxiliary, other vessels or aircraft owned or operated by a State and used, for the time being, only on government non-commercial service. However, each State shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such vessels or aircraft owned or operated by it, that such vessels or aircraft act in a manner consistent, so far as is reasonable and practicable, with this Convention.

The following subsections describe the rights of coastal States with respect to various maritime zones.[88]

#### *2.6.1.1 Ports and internal waters*

The general observations laid down in subsections 3.4.2 and 3.4.3 constitute the core of the regime in ports and internal waters. It is nevertheless important to note here that although UNCLOS does not constrain a State's wide discretion to prescribe in relation to ports and internal waters, this could occur through adherence to relevant IMO instruments. UNCLOS explicitly recognizes this possibility in Article 237. But while some specific provisions in relevant IMO and ILO instruments constrain a State's right to prescribe more stringently - or, in other words, its 'residual' prescriptive jurisdiction[89] - such constraints do not arise from

[85] For a discussion see Molenaar (1998), *op cit*, at pp. 140-167.
[86] Cf. Article 211(2) of UNCLOS.
[87] Cf. Arts 21(2), 39(2) and 211(5) of UNCLOS.
[88] For a full overview see Molenaar (1998) *op cit*.
[89] E.g. Section 15(1) of Annex VI to MARPOL 73/78.

mere adherence to these instruments as such.[90] In fact, several provisions in IMO instruments explicitly confirm the port State's residual prescriptive jurisdiction.[91]

In addition to these residual powers, Article 218 of UNCLOS also explicitly grants the port State a new right that is not likely to also exist under customary international law. This innovative provision gives a port State enforcement jurisdiction over illegal discharges beyond its own maritime zones, namely the high seas and the maritime zones of other States.[92]

Apart from rights, States also have relevant international obligations with respect to foreign vessels in their ports and internal waters. One such obligation is contained in Article 219 of UNCLOS for 'unseaworthy' vessels. Moreover, the regional arrangements (MOUs) on port State control contain non-legally binding commitments on inspection.

#### *2.6.1.2 Territorial sea*

Within its territorial sea a coastal State is entitled to prescribe more stringent (unilateral) standards, provided they "shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards".

The rationale of this provision is to safeguard the objective of uniformity in the regulation of international shipping, which would be undermined if States unilaterally prescribe standards that have extra-territorial effects. For instance, unilateral fuel requirements affect this objective for the reason that compliance seems to require substantial and costly adjustments to vessels. Such requirements should therefore be treated analogously with CDEM standards.[93]

By implication, Article 21(2) allows the coastal State in any case to set more stringent discharge, emission and navigation standards. As regards navigation standards, this is confirmed by Article 22 of UNCLOS. In cases where it is not entirely clear whether or not a standard should be categorized as, or analogous to, a CDEM standard, account should be taken of the rationale of Article 21(2) as explained above.

In terms of navigational standards a coastal State is only required to take account of IMO's recommendations. Otherwise, and subject to specific rules intended to safeguard the freedom of navigation (as regards straits used for international navigation) a coastal State is basically free to prescribe sea lanes and traffic separation schemes as it sees fit, and to visit non-compliance with penal consequences.

To this end a coastal State may *inter alia* regulate the protection of facilities, installations, cables and pipelines, the conservation of living marine resources, and the preservation of the environment of the coastal State. Article 21(1) states that

> The coastal State may adopt laws and regulations, in conformity with the provisions of this Convention and other rules of international law, relating to innocent passage through the territorial sea, in respect of all or any of the following:

[90] Cf. L.S. Johnson, *Coastal State Regulation of International Shipping* (Dobbs Ferry, Oceana Publications: 2004), at p. 44.
[91] E.g. Regulation XI-2/2(4) of SOLAS 74 (on maritime security), para. B/4.34 of the International Ship and Port Facility Security Code (ISPS Code; IMO Doc. SOLAS/CONF.5/34, of 17 December 2002); Article 1(3) of the Anti-Fouling Convention; and Article 2(3) of the BWM Convention.
[92] See also Articles 228 and 230 of UNCLOS.
[93] For a concrete example see Molenaar (2007) *op cit* at p. 250, n. 50.

(a) the safety of navigation and the regulation of maritime traffic;
(b) the protection of navigational aids and facilities and other facilities or installations;
(c) the protection of cables and pipelines;
(d) the conservation of the living resources of the sea;
(e) the prevention of infringement of the fisheries laws and regulations of the coastal State;
(f) the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof;
(g) marine scientific research and hydrographic surveys;
(h) the prevention of infringement of the customs, fiscal, immigration or sanitary laws and regulations of the coastal State.

Coastal States also retain a large measure of at-sea enforcement jurisdiction within the territorial sea, subject only to the need for "clear grounds" that a violation of its laws and regulations has taken place.[94]

In comparison with the normal regime for the territorial sea, the regime of transit passage considerably constrains the legislative and enforcement jurisdiction of coastal States and considerably relaxes the modalities of passage for foreign vessels and the stringency of the standards that are to be complied with. Vessels in transit passage are subject to the limited prescriptive jurisdiction that coastal States can exercise individually pursuant to Article 42(1) or in cooperation with the IMO pursuant to, or along the lines of, Article 41.

#### *2.6.1.3 EEZ*

As regards prescriptive jurisdiction, the general rule set out in subsection 2.5.1 applies: coastal State prescriptive jurisdiction over vessel-source pollution is optional but, if exercised, cannot be more stringent than the level of GAIRAS. Moreover, Article 211(5) of UNCLOS specifies that the purpose of jurisdiction is limited to "the prevention, reduction and control of pollution". Coastal States would therefore not be entitled to adopt laws and regulations that relate exclusively to maritime safety and security.

As regards enforcement, paragraphs (3), (5) and (6) of Article 220 contain very specific and complex provisions dependent on the quality of the evidence that a violation has taken place and the seriousness of the actual or potential damage of the violation.

Article 220(3) provides that where an alleged violation of applicable international rules and standards for the prevention, reduction and control of pollution from vessels or coastal State laws that give effect to such rules and standards takes place in an EEZ the relevant coastal State may require an offending vessel that is within its EEZ or territorial sea to provide information regarding its identity and port of registry, its last and its next port of call and other information required to establish whether or not such a violation has occurred.

Article 220(5) states:

> Where there are clear grounds for believing that a vessel navigating in the exclusive economic zone or the territorial sea of a State has, in the exclusive economic zone, committed a violation referred to in paragraph 3 resulting in a substantial discharge causing or threatening significant pollution of the marine environment, that State may undertake physical inspection of the vessel for matters relating to the violation if the vessel has refused to give information or if the information supplied by the vessel is manifestly at variance with the evident factual situation and if the circumstances of the case justify such inspection.

Article 220(6) goes on to provide that where there is 'clear objective evidence' that a vessel navigating in the EEZ or territorial sea has committed a violation of applicable international rules and standards or coastal State laws giving effect to them (as described in article 220(3), 'resulting in a discharge causing major damage or threat of major damage to the

[94] Article 220(2) of UNCLOS.

coastline or the related interests of the coastal State, or to any resources of its territorial sea' or EEZ that State may 'providing the evidence so warrants' institute enforcement proceedings including the detention of the vessel.

More stringent standards can also be adopted for special areas within the EEZ pursuant to Article 211(6) of UNCLOS. But as this requires at any rate IMO approval, it gives coastal States no unilateral prescriptive authority.

The PSSA Guidelines developed by IMO also implement Article 211(6)[95] and are clearly inspired by, and consistent with, that provision. The particularly sensitive sea area (PSSA) concept is a unique soft law concept devised by the IMO to provide protection for environmentally sensitive sea areas, both within and beyond national jurisdiction, from the harmful effects of international shipping activities. The PSSA concept is discussed in more detail in Section 9.2.1 below.

UNCLOS grants coastal States no extra enforcement jurisdiction within special areas.[96]

Within its EEZ by contrast, the freedom of navigation can only be controlled by the coastal State as a result of the exercise of the sovereign rights to exploit the resources of the EEZ or of the exercise of its jurisdiction, such as the creation of artificial islands, installations and structures and of safety zones around offshore installations (Articles 60(4) and 80). Those installations and safety zones may not however be established where they could interfere with recognized sea lanes essential to international navigation (Article 60 (7)).

Otherwise as regards ships routing measures in the EEZ and on the high seas, the legal basis is provided by SOLAS.[97] Most of these are recommendatory in character only a minority are mandatory.

#### *2.6.1.4 High Seas*

On the high seas, flag States have an exclusive regulatory and enforcement competence over the vessels that fly their respective flags in terms of the safety of navigation and vessel source pollution. In other words coastal States that have not claimed an EEZ or relevant derivative zone, including the coastal States of the Mediterranean, have no enforcement jurisdiction in terms of vessels navigating relatively close to their coasts: if no EEZ or relevant derivate zone has been claimed then the high seas begin beyond 12 nm from the baseline.

### 2.6.2 Fisheries and mariculture

The basic legal regime under international law regarding the management and extraction of fish and other marine living resources is provided by UNCLOS. In seeking to ensure the sustainable use of marine living resources this regime seeks to reconcile the development of efficient fisheries with resource conservation and management.

Under UNCLOS the rights and obligations of States relating to the conservation and management of marine living resources are again different according to where the resources are located.

[95] See para. 7.5.2.3(iii) of the PSSA Guidelines.
[96] Cf. Article 220(8) of UNCLOS.
[97] London, 1 November 1974; 1184 UNTS 3.

#### *2.6.2.1 Territorial sea and internal waters*

All natural resources, including living resources found in the territorial sea or waters landward of it are under the sovereignty of the coastal State. Such sovereignty entitles the coastal State to adopt laws and regulations in respect of the conservation and management of such resources (Articles 2 and 21(d)).

Although no reference is made to mariculture in UNCLOS, rights and obligations associated with such activity could be considered within the legal framework provided therein meaning that mariculture may take place within the territorial sea subject to the sovereignty of the coastal State.

#### *2.6.2.2 EEZ*

Within the EEZ, the coastal State has sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, including all living resources (Article 56).

Article 61 concerns the conservation of living resources. While Article 61(2) requires coastal States to ensure, through proper conservation and management measures, that the maintenance of the living resources in the EEZ is not endangered by overexploitation, the focus of UNCLOS is on the utilisation of the living resources as demonstrated by Article 62(1). This Article states:

> The coastal State shall promote the objective of optimum utilization of the living resources in the exclusive economic zone without prejudice to Article 61.

This does not mean that the coastal State cannot restrict access to the living resources in the EEZ for its own or foreign nationals. This is evidenced by Article 62(4), which provides that:

> Nationals of other States fishing in the exclusive economic zone shall comply with the conservation measures and with the other terms and conditions established in the laws and regulations of the coastal State. These laws and regulations shall be consistent with this Convention and may relate, inter alia, to the following…
> (c) regulating seasons and areas of fishing, the types, sizes and amount of gear, and the types, sizes and number of fishing vessels that may be used;…

Since UNCLOS provides that the coastal State can regulate areas of fishing, the coastal State can also regulate areas of "non-fishing", in other words areas in which fishing is restricted or forbidden ('no-take' areas) where this is necessary for conservation and management purposes.

In other words a coastal State has full prescriptive and enforcement jurisdiction.

It can also be assumed that in the EEZ, the coastal State has sovereign rights over mariculture, as such activity may be considered as being within the framework of "other activities for the economic exploitation and exploration of the zone" (Article 56(1)(a).

#### *2.6.2.3 High Seas*

On the high seas, all States enjoy the freedom of fishing (Article 87(e)), subject to their international obligations (Article 116 (a)), to the rights, duties and interests of coastal States (Article 116 (b)), as well as to the obligations of all States to cooperate for the conservation and management of the living resources of the high seas (Articles 117 to 119). Article 118 in particular provides that

> States shall cooperate with each other in the conservation and management of living resources in the areas of the high seas. States whose nationals exploit…living resources in the same area, shall enter into negotiations with a view to taking the measures necessary for the conservation of the living resources concerned. They shall, as appropriate, cooperate to establish subregional or regional fisheries organizations to this end.

In other words UNCLOS is largely confirmatory of the principle of customary law providing for freedom of fishing on the high seas subject, *inter alia*, to a general duty to co-operate in the conservation and management of high seas fish stocks, which will often entail entering into negotiations to agree any necessary conservation measures. To this end numerous such agreements have been concluded to establish regional fisheries management organisations (RFMOs). Such agreements are, however, as a matter of international law, only binding on the States which are party to them. No State, or group of States, can unilaterally impose conservation measures in respect of high seas fish stocks on another State, or on any vessel flying the flag of such a State.

In regulating international fishing beyond the limits of their EEZs, States depend on either direct co-operation between them or on international conventions and RFMOs to adopt measures for management and conservation of living resources. The UN Fish Stocks Agreement obliges coastal States and States fishing on the high seas for straddling and highly migratory fish stocks (those that occur both within the EEZ of one or more States and in an adjacent or more distant area of high seas) to co-operate to ensure conservation and optimum utilisation of fish resources both within and beyond EEZs.

The UN Fish Stocks Agreement, which now has 78 parties including the EU and all 27 Member States[98], has instituted a number of important substantive and procedural clarifications to the duty of cooperation. Article 8(4) namely contains a notable addition to the norms of UNCLOS limiting the access to the freedom of fishing on the high seas only to those States which are members of sub-regional or regional fisheries organisations or participants in conservation and management arrangements, or which agree to apply the measures established by such organisations or arrangements.

This strengthens the hand of RFMOs, in that States having a “real interest” in the relevant fishery are now obliged to pursue cooperation in relation to those stocks, either directly or through appropriate RFMOs. In other words, where the RFMO has the competence to establish conservation and management measures for such stocks, States must give effect to their duty to cooperate by joining the RFMO or applying the measures established by it, the only alternative being to refrain from fishing for the stocks concerned.

As regards the Mediterranean, the relevant RFMOs are the GFCM and ICCAT.

### 2.6.3 Maritime surveillance and security

Surveillance and security are somewhat ‘hot’ issues in the Mediterranean in terms of smuggling, illegal immigration and so on.

For the purpose of analysing maritime surveillance activities it is useful to distinguish between ‘reporting regimes’ and ‘surveillance schemes’. Under a reporting regime, a person or vessel subject to that regime must be actively report data (automatically, manually or both) to a specific agency. In contrast under a surveillance scheme, data is gathered by

[98] Table recapitulating the status of the Convention and of the related Agreements, as at 20 September 2011. Information obtained from http://www.un.org/Depts/los/reference files/status2010.pdf.

surveillance methods in respect of which the person or vessel that is subject to the scheme plays no active part.

In terms of reporting regimes a flag State is entitled to impose, through its own legislation, the reporting requirements under a reporting regime of those vessels that fly its flag (in other words this is a flag state competence). This is why many reporting regimes are adopted through the auspices of IMO.

At the same time, though, a coastal State may be entitled to introduce and enforce a reporting regime by reference to the passage or presence of third country vessels within its maritime zones (a coastal State competence) or which seek to enter its ports (a port State Competence). Such rights derive from the sovereignty or sovereign rights that such a State enjoys within its maritime zones.

As regards surveillance schemes, as the person or vessel subject to the scheme plays no active role, the issue simply a question of which State has the legal right to undertake surveillance within a given maritime space.

Before looking at the rights of coastal States as regards maritime surveillance and security, mention can also be made of the International Convention on Maritime Search and Rescue (the 'SAR Convention')[99] which provides for the establishment of a particular type of maritime area namely the search and rescue ('SAR') region. SAR regions are established solely for the purpose of coordinating maritime SAR activities from a rescue coordination centre and are not related to the delimitation of any boundary between States including the boundaries of maritime zones established pursuant to UNCLOS. In other words the issue as to whether or not coastal States have claimed EEZs (or derivative zones) has no impact on the functioning of the SAR regime and vice versa. The two types of spatial delineation – SAR regions under the SAR Convention and maritime zones established under UNCLOS – operate in complete independence to each other.

In terms of the rights of coastal States as regards maritime surveillance and security the situation can be summarised as follows.

#### *2.6.3.1 Territorial sea and internal waters*

A coastal State clearly has the exclusive right to undertake monitoring and surveillance activities within its territory including its territorial sea. This observation is equally valid for reporting regimes as well as surveillance schemes. Mandatory port entry reporting requirements are an obvious example.

Subject to the right of innocent passage, a coastal State is entitled to undertake security related enforcement measures within its territorial sea.

#### *2.6.3.2 Contiguous Zone*

Within its Contiguous Zone, if one has been claimed, a coastal State enjoys no particular additional surveillance powers. It is, however, as described above entitled to undertake control measures relating *inter alia* to applicable customs, fiscal, immigration legislation.

[99] International Convention on Maritime Search and Rescue, London, 27 April 1979. In force 22 June 1985, as amended.

#### *2.6.3.3 EEZ*

Within its EEZ, a coastal State has the exclusive right to undertake surveillance in connection with activities relating to living and non-living resources and with regard to other activities for the economic exploitation and exploration of that EEZ and the continental shelf, such as the production of energy. In this connection it is important to note that the exclusivity of the rights of the coastal State to undertake surveillance depend entirely on the scope of activities in respect of which it claims sovereign rights.

Thus in a Mediterranean context a coastal State that has not claimed an EEZ or derivative zone such as a fishery zone has no exclusive right to undertake fisheries surveillance activities in the waters immediately beyond its territorial sea except as regards sedentary species (pursuant to the continental shelf regime).

As regards both reporting regimes and surveillance schemes a coastal State has the exclusive right to undertake monitoring and surveillance in connection with activities relating to living and non-living resources and with regard to other activities for the economic exploitation and exploration of the EEZ and the continental shelf, such as the production of energy. In other words a coastal has the exclusive right to establish a satellite based vessel monitoring system (VMS) regime within its territorial seas. All vessels engaged in fishing activities within the EEZ can be required as a matter of international law to effectively participate in such VMS system.[100]

In terms of other types of reporting regimes, such as AIS[101] and LRIT[102], maritime zones are less relevant. As regards AIS, all vessels are entitled to receive transmitted data as are coastal monitoring stations. As regards LRIT, a port State is entitled to LRIT data in respect of a ship that is at sea, irrespective of where it is, that has indicated its intention to enter a port facility in that State or a place under the jurisdiction of that State while a coastal State is entitled to the data in respect of a ship at sea, other than within the territorial waters of its flag State that is within 1,000 nm of its coast (even if the ship does intend to enter a port in that State).

As regards mandatory ship reporting systems that apply to specific stretches of water, a large number of mandatory ship reporting systems are to be found in European waters including in the Mediterranean. These include ADRIREP (Italy, Slovenia), BONIFREP (France, Italy), GIBREP. However these too are adopted through IMO and therefore while a

[100] Such as the EU VMS regime established pursuant to Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy (OJ L 112, 30.4.2011, p. 1)

[101] An 'Automatic Identification System' (AIS) is a ship born mechanism that automatically provides for the exchange of information between ships as well as the provision of such data to coastal stations. Each AIS consists of transponder unit that includes a GPS geographical position measuring system, a very high frequency (VHF) transmitter/receiver and a display/terminal. The unit broadcasts a message at regular intervals that sets out the identification, position, speed, and course of the ship in addition to certain detailed items about the ship and its cargo. This message can then be picked up by other ships (as well as coastal stations) within VHF range (which is essentially line of sight) which in turn send their own messages. Through an automatic protocol, called SOTDMA, no two transmitters within range of each other transmit at the same time. In terms of the law of the sea, the basic obligation to fit and use AIS is imposed by Regulation 19 of Chapter V of SOLAS.

[102] Long-Range Identification and Tracking of Ships (LRIT) is a relatively new long-range vessel monitoring system that was adopted through IMO Resolution MSC 202 (81) on 19 May 2006 amending SOLAS. Like AIS, LRIT requires the periodic transmission of the name and position of relevant vessels. Unlike AIS, however, the data will be transmitted only every six hours and such transmissions will take place via satellite directly to an LRIT Data Centre in the flag State.

mandatory reporting scheme may apply within the EEZ of a coastal State in practice there is no formal legal link between the status of such waters and the obligation of a vessel to comply with the reporting regime.

As regards security and enforcement issues the powers of the coastal State are restricted essentially to the enforcements of the rights that it enjoys within its EEZ namely those rights relating to economic activities and environmental protection. As far as, say, the smuggling of people or illegal goods is concerned, the presence or otherwise of an EEZ is largely irrelevant as regards the competence of a coastal State is concerned.

Thus, for example, neither the 1988 SUA Convention (the Convention tor the Suppression of Unlawful Acts of Violence Against the Safety of Maritime Navigation as revised on 14 October 2005 by the Protocol to the Convention tor the Suppression of Unlawful Acts of Violence Against the Safety of Maritime Navigation103), nor the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances104 even refer to the EEZ:105 the concept is essentially irrelevant to their respective purposes.

#### *2.6.3.4 High Seas*

On the high seas (i.e. in areas beyond national jurisdiction) all States have the implied right to undertake surveillance but not to the extent of interfering with the exercise of the freedoms of the high seas by ships flying a foreign flag. As a general principle, enforcement measures on the high seas, including those relating to illegal activities such as smuggling, are based around the competence and consent of the flag State. However, by way of exception to this general principle, pursuant to Article 110 of UNCLOS (the so-called 'right of visit') a warship may, in certain circumstances, board a foreign ship in cases where there is reasonable ground for suspecting that that ship is: (a) engaged in piracy; (b) engaged in the slave trade; (c) engaged in unauthorized broadcasting (provided the flag State of the warship has jurisdiction under article 109 of UNCLOS); (d) without nationality; or (e) in reality of the same nationality as the warship although flying a foreign flag or refusing to show its flag.

### 2.6.4 Environmental protection and marine protected areas

While UNCLOS does not require the establishment of marine protected areas (MPAs), it is the source of States' authority to create and enforce them[106]. Pursuant to UNCLOS, States have a general duty to protect and preserve the marine environment and to exploit natural resources in accordance with this duty. Article 192 places all State parties under the general obligation "to protect and preserve the marine environment". Article 193 specifies that:

> States have the sovereign right to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.

Article 194(1) elaborates on the general obligation to protect and preserve the marine environment and provides:

> States shall take, individually or jointly as appropriate, all measures consistent with this Convention, that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities and they shall endeavour to harmonize their policies in this connection.

[103] IMO Doc. LEG/CONF.15/21, 1 November 2005.
[104] 1582 *United Nations Treaty Series* 165.
[105] This is the case even though the SUA Convention does specifically apply to 'waters beyond the outer limits of the territorial sea', in other words the waters of the EEZ as well as the high seas (article 4).
[106] Young, T. R. *op cit.*

These obligations apply to all sea areas under the sovereignty and jurisdiction of coastal States as well as applying in principle to their activities on the high seas.

#### *2.6.4.1 Territorial sea and internal waters*

The right of a coastal State to establish MPAs and to take other measures to protect the marine environment within its territorial sea and waters landward derives from the sovereignty that it enjoys over such waters.

Measures taken by parties to UNCLOS "shall include those necessary to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life" (Article 194(5)). The provisions setting out these obligations include the option of declaring specific areas in which certain activities may be prohibited or restricted.

However Article 194(4) puts a limit to a State's discretion with regard to the design of protection measures, by stating that:

> In taking measures to prevent, reduce or control pollution of the marine environment, States shall refrain from unjustifiable interference with activities carried out by other States in the exercise of their rights and in pursuance of their duties in conformity with this Convention.

#### *2.6.4.2 EEZ*

Within its EEZ or equivalent subsidiary zone (and depending on the wording of the relevant national measure relating to the latter) the right of a coastal State to undertake measure to protect the marine environment and to establish MPAs derives from its sovereign rights to conserve and manage natural resources.

The CBD, strengthens the obligations of the parties to UNCLOS to protect the marine environment, including in the EEZ and on the continental shelf. The jurisdictional scope of the CBD is specified in Article 4. This states:

> Subject to the rights of other States, and except as otherwise expressly provided in this Convention, the provisions of this Convention apply, in relation to each Contracting Party:
>
> (a) In the case of components of biological diversity, in areas within the limits of its national jurisdiction; and
>
> (b) In the case of processes and activities, regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.

In other words the jurisdictional scope of the CBD applies to the territorial seas and to the EEZ as areas within the limits of national jurisdiction.

Article 3 expresses the general responsibility of all States to ensure that activities within their jurisdiction or control do not cause damage to the environment of areas beyond national jurisdiction.

In respect of areas beyond national jurisdiction, the Contracting Parties are urged to cooperate with other Contracting Parties directly or where appropriate, through competent international organisations for the conservation and sustainable use of biological diversity (Article 5). Article 8 of the Convention provides the following specific responsibilities for Contracting Parties in relation to protected areas, ecosystems and natural habitats within national jurisdiction:

> (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;
> (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or where special measures need to be taken to conserve biological diversity;
> (c) Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation or sustainable use;
> (d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
> (e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.

Moreover the Parties are required to prepare and update inventories of biological resources as a basis for planning and decision-making. The CBD also obliges the Parties to develop national strategies for the conservation and sustainable use of biological diversity, including the establishment of protected areas.

It also requires the Contracting Parties to integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. However the CBD itself foresees that its provisions should be applied with respect to the marine environment consistently with the rights and obligations of States under the law of the sea (Article 22(2)).

In 2004 the Parties to the CBD committed themselves to designating a system of representative, comprehensive and effectively managed MPAs by 2012. An open-ended working group was established which *inter alia* will assess the implementation. The working group will also address the establishment of MPAs outside national jurisdiction.[107]

The Convention on the Conservation of Migratory Species of Wild Animals[108] (CMS) deals with particular species (or groups of species). The primary requirement imposed on Parties is to take measures to protect, manage and conserve their habitats. The CMS relies on the development of specialised agreements among the range States of particular listed species, under which they agree to management plans for the species' protection. These agreements most often combine a habitat focus with management plans but without reaching a "formal geographic protection".[109] They thus do not provide for direct constraints for MPA development but can be regarded as drivers for the designation of protected areas. Specific agreements include the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area[110] (ACCOBAMS).

Remaining at the regional level, the establishment of MPAs is recommended by the 1995 Protocol to the Barcelona Convention Concerning Mediterranean Specially Protected Areas and Biological Diversity in the Mediterranean.[111]

Article 4 of the 1995 Protocol provides a comprehensive statement of the objective of MPAs with strong antecedents in the CBD. Article 4 provides:

> The objective of specially protected areas is to safeguard:
> (a) representative types of coastal and marine ecosystems of adequate size to ensure their long term viability and to maintain their biological diversity;
> (b) habitats which are in danger of disappearing in their natural area of distribution in the Mediterranean or which have a reduced natural area of distribution as a consequence of their regression or on account of their intrinsically restricted area;

[107] COP 7 Decision VII/5, Kuala Lumpur, 9 - 20 February 2004
[108] Bonn, 23 June 1979; 1651 UNTS 333.
[109] Young *op cit*, p.239.
[110] Monaco, 24 November 1996; 2183 UNTS 303.
[111] Barcelona, 10 June 1995; 2102 UNTS 181.

(c) habitats critical to the survival, reproduction and recovery of endangered, threatened or endemic species of flora or fauna;
(d) sites of particular importance because of their scientific, aesthetic, cultural or educational interest.
(e) sites of biological and ecological value:
- the genetic diversity, as well as satisfactory population levels, of species, and their breeding grounds and habitats
- representative types of ecosystems, as well as ecological processes;
(f) sites of particular importance because of their scientific, aesthetic, historical, archaeological, cultural or educational interest.

The Protocol places a general obligation on the Parties "to protect, preserve and manage in a sustainable and environmentally sound way areas of particular natural or cultural value, notably by the establishment of specially protected areas (Article 3(1)(a) - called "Specially Protected Area of Mediterranean Interest" (SPAMI) and provides for a set of protective measures to use in case such an area is established, including the regulation of the passage of ships or the regulation or prohibition of any activity involving the exploration or modification of the soil or the exploitation of the subsoil.

The Protocol is applicable to all marine waters, irrespective of their legal status as well as to the seabed and subsoil and to coastal terrestrial areas designated by each party. If a SPAMI is established on the high seas the protection measures are those prescribed by the State proposing the SPAMI: other parties must comply with the agreed measures but enforcement must be in accordance with international law[112]. In other words as such areas would lie within the high seas, enforcement would be the responsibility of the flag States as discussed further in the following paragraphs.

#### *2.6.4.3 High seas*

As seen, the CBD's jurisdictional scope is not limited to areas under national jurisdiction. Although it is clearly understood that any measures beyond the limits of national jurisdiction must be carried out within the framework of UNCLOS legal regime, the CBD has stimulated the perception of ecosystems, habitats (and "areas") in the marine environment.[113]

As regards areas outside coastal State jurisdiction, the governing principle is Article 89 of UNCLOS, by which no part of the high seas is capable of being reduced to the sovereignty of any State.

That said, most experts on high seas governance take issue with the formerly widespread assumption that high seas MPAs are *per se* impossible; it is open to States: (a) to agree among themselves on a uniform or mutual recognition regime of the designation of MPAs on the high seas if they are willing to forgo enforcement on third State vessels; or (b) to adopt measures in the form of recommendations rather than obligations, in the expectation that these will eventually come to be seen as best practice, and thus will become indirectly but generally binding by virtue of provisions in Part XII of UNCLOS such as Articles 207(3) and (4), 210(4) and (6) and 211(1) and (2), or (c) in theory at least act through the IMO to declare an area of the high seas as a PSSA (see next section).[114]

[112] Churchill, R.R. and Lowe, A.V. "The Law of the Sea", *op cit* 1999, p. 393.
[113] Czybulka, D. (2001). The Convention on the Protection of the Marine Environment of the north-east Atlantic, *in*: Thiel, H.; Koslow, J.A. (Ed.) (2001). *Managing risks to biodiversity and the environment on the high sea, including tools such as Marine Protected Areas - Scientific Requirements and Legal Aspects: Proceedings of the Expert Workshop held at the International Academy for Nature Conservation, Isle of Vilm, Germany, 27 February - 4 March 2001. BfN (Bundesamt für Naturschutz)-Skripten,* 43: p 181.
[114] Although this approach would require obtaining the agreement of the 167 member governments of IMO.

Over recent years the United Nations General Assembly, assisted by an *Ad-hoc* Open-Ended Informal Working Group established in 2004, has adopted a number of resolutions that contain references to the establishment of MPAs, and in 2009 called upon States to strengthen in a manner consistent with international law, in particular UNCLOS, the conservation and management of marine biodiversity and ecosystems and national policies in relation to MPAs.[115]

To date relatively few MPAs have been established in areas beyond national jurisdiction. Examples include the Indian Ocean and Southern Ocean Sanctuaries established under the International Whaling Commission and measures taken by certain RFMOs such as the North East Atlantic Fisheries Commission (NEAFC) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). One important example of a high seas MPA is the Pelagos Sanctuary which is described in detail in section 9.2.1 below.

Mention can also be made of measures undertaken in September 2010 within the auspices of the North Atlantic Convention for the Protection of the Marine Environment of the North-East Atlantic, 1992[116] (the OSPAR Convention) relating to the establishment of an MPAs in areas beyond national jurisdiction in the North Atlantic, in particular the Charlie Gibbs Fracture Zone on the Mid Atlantic Ridge and the Milne Seamount Complex as well as in the waters superjacent to the seabed of the Altair, of the Antialtair and of the Josephine Seamounts, as well as of an area of the Mid-Atlantic Ridge North of the Azores. In fact, given that the latter areas of sea bed are subject to a submission by Portugal to the Commission on the Limits of the Continental Shelf (CLCS) for an extended continental shelf claim (see section 2.4.8 above) they more resemble the situation in the Mediterranean where, as already described, the entire seabed is subject to coastal States continental shelf claims.

Indeed it is possible to distinguish between 'high seas MPAs' that are: (a) completely beyond national jurisdiction where the water column and surface lie beyond 200 nm from the closest baseline and the seabed is not subject to a continental shelf claim; and (b) the cases where the sea-bed forms part of the continental shelf (or extended continental shelf) of a coastal State while the water column and surface form part of the high seas for legal/geographical reasons (in that they are beyond 200 nm from the relevant baseline) or politico-legal reasons (in those cases where the coastal State has elected not to claim an EEZ or derivative zone). The key difference is that in the latter case a coastal State is entitled to rely on its continental shelf jurisdiction to regulate activities on the sea-bed in accordance with international law.

As regards both types of high seas MPA, however, States that seek to promote their establishment and implementation can only rely on the participation of relevant flag States as regards the enforcement of any particular protection rules relating activities on the surface or within the water column of such an MPA. In the context of such an MPA established on the basis of a regional agreement, such as for example the OSPAR Convention or more pertinently the Barcelona Convention, such rules will only as a matter of international law be applicable against vessels that fly the flags of States that are parties to that agreement. Moreover in the absence of some form of specific multi-lateral enforcement mechanism breaches of such rules will depend primarily on flag State enforcement. In short while evolving practice shows that it is possible to establish high seas MPAs, it is clear that enforcement will invariably remain a much bigger challenge than is the case where an MPA (or part of an MPA) is established by a coastal State in reliance on the maritime zoning provisions of UNCLOS in particular the provisions relating to the establishment of EEZs and the rights of such States within their territorial seas.

[115] Salpin, C. & Germani, V. 'Marine Protected Areas beyond areas of national jurisdiction: what's mine is mine and what you think is yours is also mine' 19 *RECIEL* (2010) 174-184 at page 176.
[116] 32 *ILM* (1993), 1068.

Finally, though, States always have the possibility of enforcing high seas MPAs not on the high seas but in their own ports, making access to their ports conditional on foreign vessels having acted or refrained from acting in a particular way in the relevant part of the high seas[117]. Such a view is, however, likely to provoke controversy among freedom of navigation advocates, often from States with strong shipping and naval interests, who argue strongly in favour of freedom navigation.[118]

#### *2.6.4.4 Protection of Sea Areas under IMO Conventions and Resolutions*

Within the IMO framework two instruments are of especially high relevance as regards the establishment of protected areas. However, as the IMO's functional competence is limited to shipping – in particular the safety of navigation and the prevention of ship-source pollution – these instruments relate specifically to harm caused by the activities of international shipping.

The first instrument is MARPOL 73/78, which provides for the designation of "Special Areas" in which the adoption of special mandatory methods for the prevention of pollution is required. Under the convention, these Special Areas are provided with a higher level of protection than other sea areas.

The PSSA Guidelines adopted by IMO build upon MARPOL 73/78. A PSSA may lie within a broader "special area" designated under one of the Annexes to MARPOL 73/78. If this is the case, the relevant vessel discharge restrictions will also apply within the particularly sensitive sea area. As already noted, the PSSA concept is a unique soft law concept devised by the IMO to provide protection for environmentally sensitive sea areas, both within and beyond national jurisdiction, from the harmful effects of international shipping activities.

A PSSA is defined as an "area which needs special protection through action by IMO because of its significance for recognized ecological or socio-economic or scientific reasons and which may be vulnerable to environmental damage by maritime activities".[119] In order to be identified as a PSSA, an area beyond or within the limits of the territorial sea should meet at least one of the criteria defined in the guidelines (uniqueness, high dependency, high representativeness, diversity, vulnerability).

[117] As long as no positive right of access is given by some other treaty, such as the 1923 Convention and Statute on the International Regime of Maritime Ports (Geneva, 9 December 1923; 58 League of Nations Treaty Series 285). However unilaterally imposed rules that have the effect of denying access to ports (even if made on the basis of Article XX g) of GATT) might be subject to challenge as being contrary to international trade. In the *EU-Chile Swordfish Dispute*, the European Commission requested, on 10 November 2000, the establishment of a World Trade Organization (WTO) panel against the Republic of Chile with a view to securing fair access to Chilean ports, which had been closed to European Community (EC) vessels since 1991 as a result of the non-recognition by the EC of conservation measures relating to swordfish unilaterally applied by Chile beyond the limit of its EEZ. The EC claimed a violation of: (a) Article V of the General Agreement on Tariffs and Trade 1994 (GATT), which guarantees freedom of transit, and: (b) Article XI of GATT which prohibits non-tariff import barriers. Chile, however, denied the competence of the WTO over the matter and instituted arbitral proceedings against the EC before ITLOS. Following negotiations between the parties both cases were suspended in January 2001.

[118] They have in their favour a New Zealand case representing this point of view, Sellers v. Maritime Safety Inspector [1999] 2 NZLR 44, in which the New Zealand legislation under which Sellers was prosecuted for leaving port without prescribed safety equipment on board was read down so as not to apply to foreign vessels, because that would interfere with their freedom of navigation on the high seas. Since the leading judgment in the Court of Appeal was delivered by Sir Ken Keith who now sits on the International Court of Justice (ICJ), this view, cannot simply be dismissed.

[119] "Revised Guidelines for the Identification and Designation of Particularly Sensitive Sea Areas", forming the Annex to IMO Assembly Resolution A.982(24) adopted on 1 December 2005

The criteria relate to particularly sensitive sea areas within and beyond the limits of the territorial sea and may enclose different States' zones of jurisdiction. In PSSAs, special protective measures within the competence of IMO under SOLAS 1974 may be proposed for adoption by the Maritime Safety Committee of IMO. These include *inter alia* "areas to be avoided" designations and traffic separation schemes. In contrast to most of the other measures, traffic separation schemes are compulsory. These measures do not affect other uses of the areas such as resource exploitation, marine scientific research, military activities or tourism. Measures for PSSAs lying beyond the territorial sea have to be international in character, i.e. based on an existing treaty[120].

Designation as a PSSA does not in itself carry any legal significance, but is rather a framework for the adoption of particular measures available under pre-existing instruments.[121] As PSSA boundaries appear on international navigational charts and as the designation carries with it the associated protective measures recognized by the IMO as necessary to prevent damage to the ecosystem included in the PSSAs from international shipping, PSSA designation augments domestic protective measures. Moreover there is nothing in principle to prevent an area of the high seas from being declared a PSSA.[122] However, while some commentators have argued that a PSSA may be regarded as a form of MPA others disagree on the basis that a single sector designation (in that a PSSA can only address shipping) is not an MPA as such.[123] Nevertheless the establishment of a PSSA might play an important role, perhaps even an essential role, in the establishment of an MPA within the EEZ or on the high seas simply because it represents an important overarching mechanism to address the impacts of shipping. Clearly, though, such an approach would not be without challenges in terms of coordinating decision making through different fora, with decisions relating to the PSSA, and thus to shipping, being taken through IMO, while decisions relating to other aspects of the MPA being taken by the relevant coordination body such as the Barcelona Convention.

### 2.6.5 Exploitation of non-living resources

In terms of the exploitation of non-living resources such as the extraction of oil, gas, sand and gravel, the position is as follows.

#### *2.6.5.1 Territorial sea*

In and landward of the territorial sea, the coastal State has sovereignty over natural resources including non-living marine resources. As to the international legal regime applying to the extraction of sand and gravel, the same rules apply as for the exploitation of oil and gas.

#### *2.6.5.2 EEZ*

Within its EEZ a coastal State has sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources of the seabed and its subsoil (Article 56 (1) (a)), including non-living marine resources. Pursuant to Article 56(3) on the seabed these rights shall be exercised in accordance with Part VI of UNCLOS, which provides for the status of the continental shelf and its resources.

[120] Churchill, R.R. and Lowe, A.V. *op cit* at page 394.
[121] IMO Resolution A.982 (24) *op cit.*
[122] Roberts, J., Chircop, A. & Prior, S. 'Area-based Management of the High Seas: Possible Application of the IMO's Particularly Sensitive Sea Area Concept' *25 International Journal of Marine and Coastal Law* (2010) 483-522 at page 500.
[123] See Roberts *et al, op cit* at page 498.

However, it is to be born in mind that on the continental shelf, the coastal State also has sovereign rights for the purpose of exploring and exploiting minerals and other non-living resources of the seabed and subsoil. Such rights are exclusive: if the coastal State does not explore the continental shelf or exploit its natural resources, no one may undertake these activities without the express consent of the coastal State (Article 77). The exclusive right to authorize and regulate drilling on the continental shelf is granted to the coastal State by Article 81.

Unlike the EEZ, the continental shelf exists *ipso jure* and does not depend on occupation, effective or notional, or on any express proclamation by coastal States.

As regards the exploitation of non-living resources beyond the EEZ or continental shelf (or as applicable the extended continental shelf), a coastal State enjoys no particular rights and the exploitation of non-living resources is subject to the regime for the Area described in section 2.4.10 above.

### 2.6.6 Dumping

Article 210 of UNCLOS provides for the legislative powers of (coastal) States with regard to dumping at sea. Article 210 states:

> 1. States shall adopt laws and regulations to prevent, reduce and control pollution of the marine environment by dumping.
> 2. States shall take other measures as may be necessary to prevent, reduce and control such pollution.
> 3. Such laws, regulations and measures shall ensure that dumping is not carried out without the permission of the competent authorities of States….
> 5. Dumping within the territorial sea and the exclusive economic zone or onto the continental shelf shall not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and control such dumping after due consideration of the matter with other States which by reason of their geographical situation may be adversely affected thereby.

In other words UNCLOS clearly provides that dumping within the territorial sea and the EEZ or onto the continental shelf may not be carried out without the express prior approval of the coastal State, which has the right to permit, regulate and control such dumping (Article 210(5)).

UNCLOS grants coastal States the right to enforce generally accepted international rules and standards vis-à-vis foreign vessels: pursuant to Article 216(1) laws and regulations adopted in accordance with Article 210 and applicable international rules and standards established through competent international organisations or diplomatic conferences for the prevention, reduction and control of pollution by dumping shall be enforced by the coastal State with regard to dumping within its EEZ or onto its continental shelf.

The original Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[124] (the London Convention) imposed a system with three different categories: dumping of waste of category I was generally prohibited, waste of category II required a prior special permit, for waste of category III a prior general permit was needed.

Contracting Parties were required to designate an authority to deal with permits, keep records, and monitor the condition of the sea (Article VI, paragraph 1).

The 1996 Protocol to the London Convention[125] was agreed to further the Convention and, eventually, replace it. As of March 2008 the EU Member States having ratified the Protocol

[124] London, Mexico City, Moscow and Washington, 29 December 1972; 1046 UNTS 120.
[125] London, 7 November 1996; (1997) 36 *ILM* 1.

are Belgium, Bulgaria, Denmark, France, Germany, Ireland, Italy, Luxemburg, Slovenia, Spain, Sweden and the United Kingdom. Member States not already listed which are parties to the 1972 Convention are Cyprus, Finland, Greece, Hungary, Malta, the Netherlands, Poland and Portugal.[126] The Protocol prohibits all at-sea incineration of wastes, waste storage in the seabed, and all other waste dumping, except for a "reverse list" of substances that may be dumped at sea.

## 2.6.7 Laying of pipelines and cables

### *2.6.7.1 Territorial sea and internal waters*

As a coastal State enjoys sovereignty over its territorial sea and internal waters, it has plenary jurisdiction regarding the laying and route of pipelines and cables there.

### *2.6.7.2 EEZ*

Article 58(1) of UNCLOS recognises the freedom of all States to lay submarine pipelines and cables in the EEZ with the result that a coastal State cannot in general control the laying by other States of cables and pipelines passing through its EEZ. In practice, though, the issue of the laying of pipelines and cables is regulated by the regime of the continental shelf.

Article 79(1) of UNCLOS establishes the basic principle that all States are entitled to place submarine pipelines and cables on the continental shelf, subject to the remaining provisions of Article 79. Article 79(3) of UNCLOS goes on to provide that

> The delineation of the course of such cables and pipelines is subject to the consent of the coastal State.

In other words the rights of the coastal State in this case are limited but may take into consideration the potential negative effects of cables and pipelines e.g. as regards the protection of special ecosystems[127].

More comprehensive control by the coastal State is possible where the cable or pipeline is to come into the territory (including the territorial sea) of the coastal State. In this respect Article 79(4) provides that

> Nothing … affects the right of the coastal State to establish conditions for cables or pipelines entering its territory or territorial sea, or its jurisdiction over cables and pipelines constructed or used in connection with the exploration of its continental shelf or exploitation of its resources or the operations of artificial islands, installations and structures under its jurisdiction.

In those cases the coastal States' permission can be made dependent on accepting control over the location (e.g. excluding certain locations/areas) as well as other features of the whole cable or pipeline.

In addition where a cable or pipeline might interfere with the sovereign rights to exploit the resources of the EEZ the coastal state may equally impose restrictions.

Further restrictions on the laying of submarine cables and pipelines may be justified through reasons to prevent, reduce and control pollution of the marine environment from pipelines (Article 79(2)). This provision thus provides for a concrete instrument for coastal States in order to fulfil their obligation under Articles 192 and 194 (see above).

[126] Taken from the IMO status list spreadsheet www.imo.org/includes/blastDataOnly.asp/data_id%3D22499/status-x.xls

[127] Wolf, R., "Rechtliche und naturschutzfachliche Aspekte beim Bau und Betrieb von Stromkabeln", Federal Agency for Nature Conservation, BfN 2004.

## 2.6.8 Renewable offshore energy generation

### *2.6.8.1 Territorial sea and internal waters*

In the territorial sea, the coastal State has sovereignty over uses of the sea including energy production.

### *2.6.8.2 EEZ*

As regards the EEZ, a coastal State's sovereign rights explicitly include the production of energy from the sea: Article 56 of the UNCLOS specifically refers to the sovereign rights of a coastal State within its EEZ "with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds…".

Since the production of energy from the sea requires in any case the use of artificial islands, installations and structures, the provisions of UNCLOS relating to such man-made features will apply as an integral part of the legal regime relating to energy from the sea.

Pursuant to Article 60 the coastal State has the exclusive right for the construction of artificial islands as well as for the authorisation and regulation of their construction, operation and use. Accordingly the coastal State can also prohibit the construction of artificial islands for reasons of the protection and preservation of rare or fragile ecosystems. The right of establishment of artificial islands, installations and structures is limited by Article 60 (7), which provides that

> Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.

The coastal State, where necessary, may establish safety zones of up to 500 metres around such artificial islands, installations and structures in which it may take appropriate measures to ensure safety both of navigation and of the artificial islands, installations and structures (Article 60(4)).

However this is not entirely conclusive of the need to establish an EEZ as any kind of wind farm equipment would need to be attached to the seabed. Article 80 of UNCLOS provides that article 60 applies *mutatis mutandis* to artificial islands, installations and structures on the continental shelf. Article 60 in turn refers back to article 56 which is the article that expressly refers to wind generation.

## 2.6.9 Military activities

In outline military vessels enjoy the right of innocent passage through all maritime zones subject to specific requirements described in the following paragraphs. The main possible limitation concerns the right of such vessels to undertake military exercises.

### *2.6.9.1 Territorial sea and internal waters*

Within the territorial sea military activities may only be undertake with the approval and consent of the coastal State. While warships also enjoy the right of innocent passage, included among the activities listed in Article 19(2) that would render passage non-innocent are 'any exercise or practice with a weapon of any kind' (paragraph (b)) and the launching, landing or taking on board of any aircraft or military devices (paragraphs (e) and (f)). In this

connection it is to be noted that the former Yugolsav States require foreign warships to provide prior notice of passage through their respective territorial seas.[128]

#### *2.6.9.2 EEZ*

Whether military exercises by non-coastal States are allowed within the EEZ of the coastal State still remains an open question. Some States consider that the carrying out of military exercises or manoeuvres, or the deployment of military installations in the EEZ is subject to the permission of the coastal State. However a majority of States consider that those activities are included within the exercise of the freedom of navigation or "other internationally lawful uses" of the sea.

Against this background the margin for the coastal State to regulate military exercises seems to be rather narrow. Flowing from the principle of sovereign immunity laid down in Articles 95 and 96 of UNCLOS for warships and other governmental ships on non-commercial service, not even measures regarding the protection and preservation of the marine environment, such as routeing measures, may be extended to foreign warships or any vessels owned by a State and operated on government service, as Article 236 states:

> The provisions of this Convention regarding the protection and preservation of the marine environment do not apply to any warship …

#### *2.6.9.3 High Seas*

In accordance with the notion of the freedom of the high seas every State enjoys the right to undertake military activities, in the form of military exercises, on the high seas subject to the general requirement specified in Article 88 of UNCLOS that the high seas 'shall be reserved for peaceful purposes'.

### 2.6.10 Marine scientific research

Marine scientific research is the subject of Part XIII of UNCLOS. Article 238 provides, by way of general principle, that all States, irrespective of their geographical location, as well as competent international organizations, have the right to conduct marine scientific research subject to the rights and duties of other States set out in UNCLOS. Article 239 imposes a general duty upon States and competent international organisations to promote and facilitate the marine scientific research while article 240 sets out a number of general principles for the conduct of such research. Section 3 of Part XII contains more specific rules as to the conduct and promotion of marine scientific research.

#### *2.6.10.1 Territorial sea*

Within its territorial sea, the sovereignty of the coastal State implies that it has full regulatory and enforcement powers regarding marine scientific research. This is reflected in article 245 which states:

> Coastal States, in the exercise of their sovereignty, have the exclusive right to regulate, authorize and conduct marine scientific research in their territorial sea. Marine scientific research therein shall be conducted only with the express consent of and under the conditions set forth by the coastal State.

[128] See for example the list of declarations made upon signature, ratification, accession or succession or anytime thereafter at the UN DOALOS website: http://www.un.org/depts/los/convention_agreements/convention_declarations.htm#Croatia%20Statement%20made%20upon%20succession accessed on 19 January 2012.

In other words coastal State consent is a pre-requisite for marine scientific research which is also subject to any conditions laid down by the coastal State.

### *2.6.10.2 EEZ*

Articles 246 to 255 of UNCLOS are concerned with marine scientific research in the EEZ as well as on the continental shelf.

Within the EEZ and on the continental shelf, coastal States have been given control over marine scientific research – including any research installations or equipment in the marine environment needed for such activities (Articles 60, 80 and 258). Moreover the consent of the coastal State is required for any type of research carried out in these zones. However the coastal State may withhold its consent only under specific conditions. In essence article 246 distinguishes between what may be described as 'applied research' and 'pure research'. There is a presumption in favour of granting consent for pure research.[129] Article 246 (3) states that:

> Coastal States shall, in normal circumstances, grant their consent for marine scientific research projects by other States or competent international organizations in their exclusive economic zone or on their continental shelf to be carried out in accordance with this Convention exclusively for peaceful purposes and in order to increase scientific knowledge of the marine environment for the benefit of all mankind. To this end, coastal States shall establish rules and procedures ensuring that such consent will not be delayed or denied unreasonably.

Article 246(5), however, goes onto provide that:

> Coastal States may …in their discretion withhold their consent to the conduct of a marine scientific research project of another State or competent international organization in the exclusive economic zone or on the continental shelf of the coastal state if that project:
> (a) is of direct significance for the exploration and exploitation of natural resources, whether living or non-living;
> (b) involves drilling into the continental shelf, the use of explosives or the introduction of harmful substances into the marine environment;
> (c) involves the construction, operation or use of artificial islands, installations and structures referred to in articles 60 and 80;

In other words while in 'normal circumstances' (which pursuant to article 246 (4) may exist even in those cases where there are no diplomatic relations between the researching State and the coastal State) consent for pure research should be given, as regards applied research the coastal State has an almost complete discretion whether or not to grant consent. Moreover as regards either types of research activity a coastal State can refuse consent where a researcher has provided inaccurate advance information as to the nature and objective of the project or if the researcher has outstanding obligations to the coastal State from an earlier research project (article 246(5)(d)).

Consent to undertake marine scientific research in the EEZ or on the continental shelf is in any event subject to conditions imposed by the coastal State regarding a range of issues including coastal State participation in the research project, the provision of preliminary reports as well as data and samples, on request, as well as an assessment of such data, also on request (article 249) in addition to any other conditions imposed in coastal State legislation.

While article 255 requires States to endeavour to adopt reasonable legislation and procedures to promote and facilitate marine scientific research beyond their seas and article 252 creates an implied consent regime, it is important to note that any dispute over whether a coastal State has improperly withheld consent is not subject to any form of compulsory

[129] Churchill, R.R. & Lowe, A.V. *op cit* at page 405.

third-party settlement except compulsory conciliation under Annex V of UNCLOS. Moreover article 297 (2)(b) of UNCLOS provides that the discretion of a coastal State to withhold consent in accordance with article 246(5) may not be called into question.

### 2.6.11 Wrecks and other historical sites

The matter of underwater cultural heritage and historical and archaeological objects found in the sea is addressed in a somewhat contradictory fashion by mandating protection but preserving traditional exploitation rights. Article 303(1) states:

> States have the duty to protect objects of an archaeological and historical nature found at sea and shall cooperate for this purpose.

Article 303(3) provides that:

> Nothing in this article affects the rights of identifiable owners, the law of salvage or other rules of admiralty, or laws and practices with respect to cultural exchanges.

Moreover Article 303(2) gives coastal States 24 nautical miles of jurisdiction for the purpose of controlling traffic in underwater cultural heritage objects, through the creation of an 'archaeological contiguous zone' as described in section 2.4.6 above, but is silent as to the remainder of the EEZ and continental shelf. However as the coastal State is entitled to take measures on its land territory and in its ports to control traffic in archaeological and historical objects, it has some scope to adopt measures in this respect.

The 2001 United Nations Educational, Scientific and Cultural Organisation Convention on the Protection of the Underwater Cultural Heritage (UNESCO Convention)[130], which is not yet in force, is intended to enable States to effectively protect and preserve their underwater cultural heritage. As a basic principle of the Convention the *in situ* preservation of underwater cultural heritage (i.e. on the seabed) must be considered as the first and preferred option before allowing or engaging in any activities directed at this heritage.

Under the Convention, Parties will have the exclusive right to regulate activities in their Internal Waters and their Territorial Sea (Article 7). For heritage found within the EEZ and the Continental Shelf, the Convention establishes a specific international cooperation regime encompassing reporting, consultations and coordination in the implementation of protective measures (Articles 9 to 11). Parties to the Convention are obliged to establish 'national authorities' who shall provide for the establishment, maintenance and updating of an inventory of underwater cultural heritage and ensure the effective protection, conservation, presentation and management of such heritage.

[130] Paris, 6 November 2001; (2002) 41 *International Legal Materials* 40. The following Mediterranean coastal countries/entities have so far ratified the Convention: Albania, Bosnia-Herzegovina, Croatia, Italy, Lebanon, Libya, Montenegro, Morocco, Palestine, Slovenia, Spain and Tunisia. http://portal.unesco.org/la/convention.asp?KO=13520&language=F. Accesed on 19 January 2012.

# 3 Classification of maritime zones and other maritime areas in the Mediterranean

A range of maritime zones have been established to date in the Mediterranean. UNCLOS provides the background against which all of these zones have been established but the UNCLOS zoning regime is complemented by a number of other instruments adopted under international law that provide for the establishment of a range of different types of maritime area.

The picture that emerges is of a patchwork of different maritime zones and areas, one that has been described by one commentator as a 'harlequin's cloak'.[131]

As regards the establishment of maritime zones, certain Mediterranean States have taken steps to claim all that they are entitled to under UNCLOS. Some indeed, have arguably claimed more than that to which they are entitled. Other States have taken preliminary measures such as the adoption of primary legislation that has yet to be fully implemented. Others have taken minimal measures in terms of establishing maritime zones beyond their continental shelf and territorial sea entitlements.

The objective of this section is to describe and analyse the current situation as regards the establishment of maritime zones and maritime areas in the Mediterranean Sea.

## 3.1 Maritime zones in the Mediterranean

In many cases the process of establishing maritime zones is not complete either because the legislative process is still under way (in the case for example where a State has adopted the relevant primary legislation but not the necessary subordinate legislation) or because maritime zone boundaries have yet to be agreed/adjudicated.

### 3.1.1 Territorial seas

As the existence of the territorial sea arises by operation of law it is not necessary for a coastal State to formally claim a territorial sea *per se* although they have some discretion as to its breadth up to a maximum limit of 12 nm. More specifically a coastal State needs to specify the breadth of its territorial sea.

In this connection most States have claimed the maximum entitlement *i.e.* 12 nm. For geographical reasons Greece and Turkey have claimed a territorial sea of only 6 nm. As regards the UK Sovereign Military Base Areas on Cyprus, in Akrotiri and Dhekelia, the 19 August 1960 Treaty concerning the Establishment of the Republic of Cyprus mentions in Annex A a marine area lying between 4 lines with distances ranging from 9.85 to 7.8 nm diverging and 6.9 to 7.2nm converging.[132] However these are marine areas surrounding

[131] Scovazzi, T, 'Recenti sviluppi nel sistema Barcelona per la protezione dell'ambiente marino nel Mediterranneo' in Triggiani, E. (ed) *Europa e Mediterranneo, Le regole per la construzione di una societa integrata* 2010 Editoriale Scientifica, Naples at page 110.

[132] Treaty concerning the Establishment of the Republic of Cyprus (Annex A) 19 August 1960. http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/GBR-CYP1960A.PDF

Line I: From the position on the low-water line lying in a 163º direction from Point No. 57D/ 1, as defined in Schedule A to this Annex, in a 163º direction for 6.85 miles; then in a 207º direction for 3 miles; and then in a 204º direction.

Line II: From the position on the low-water line lying in a 108½º direction from Point No. 59A/5, as defined in Schedule A to this Annex, in a 108½º direction for 7.8 miles; and then in a 136º direction.

military bases and do not constitute sovereign territorial waters. A territorial sea with a breadth of 3 nm has been claimed in respect of Gibraltar. The entitlement of the UK/Gibraltar to a territorial sea or any other maritime jurisdiction is contested by Spain.[133]

Finally mention can also be made of the Gaza Strip which has a 40 kilometre coastline. The current legal status of the waters off the Gaza Strip raises complex and controversial questions of international law. Pursuant to the Cairo Agreement[134], which was subsequently absorbed into the Interim Agreement,[135] it was agreed that Israel would have full control and sole security authority over the territorial waters adjacent to the Gaza Strip while at the same time the Gaza Strip was to have a 20 nm fishing/activity zone. Since 3 January 2009 the Israeli Navy has operated an exclusion zone within these waters on the stated basis of customary international law relating to naval warfare (rather than UNCLOS).[136]

### 3.1.2 Contiguous zones

In the Mediterranean to date only Algeria, Cyprus, Egypt, France, Italy Malta, Monaco, Morocco, Spain, Syria and Tunisia have claimed a contiguous zone. In each case this extends to 24 nm.[137] The outer boundaries of the contiguous zone are based on territorial sea boundaries so there is usually no need to have a separate boundary delimitation as regards contiguous zones *per se*.

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Line III: From the position on the low-water line lying in a 170º direction from Point No. 41B/10, as defined in Schedule B to this Annex, in a 170º direction for 3.8 miles; then in a 136º direction for 3.1 miles; and then in a 156º direction.
Line IV: From the position on the low-water line lying in a 103º direction from Point No. 42B/3, as defined in Schedule B to this Annex, in a 103º direction for 0.9 miles; then in a 150º direction for 6.3 miles; and then in a 176º direction.

[133] On signing UNCLOS on 4 December 1984 Spain made the following declaration: '1. The Spanish Government, upon signing this Convention, declares that this act cannot be interpreted as recognition of any rights or situations relating to the maritime spaces of Gibraltar which are not included in article 10 of the Treaty of Utrecht of 13 July 1713 between the Spanish and British Crowns. The Spanish Government also considers that Resolution III of the Third United Nations Conference on the Law of the Sea is not applicable in the case of the Colony of Gibraltar, which is undergoing a decolonization process in which only the relevant resolutions adopted by the United Nations General Assembly apply'. A similar declaration was made by Spain upon ratification of UNCLOS on 15 January 1997): '2. In ratifying the Convention, Spain wishes to make it known that this act cannot be construed as recognition of any rights or status regarding the maritime space of Gibraltar that are not included in article 10 of the Treaty of Utrecht of 13 July 1713 concluded between the Crowns of Spain and Great Britain. Furthermore, Spain does not consider that Resolution III of the Third United Nations Conference on the Law of the Sea is applicable to the colony of Gibraltar, which is subject to a process of decolonization in which only relevant resolutions adopted by the United Nations General Assembly are applicable'. Upon accession to UNCLOS on 25 July 1997 the UK made the following declaration regarding Gibraltar: 'With regard to point 2 of the declaration made upon ratification of the Convention by the Government of Spain, the Government of the United Kingdom has no doubt about the sovereignty of the United Kingdom over Gibraltar, including its territorial waters. The Government of the United Kingdom, as the administering authority of Gibraltar, has extended the United Kingdom's accession to the Convention and ratification of the Agreement to Gibraltar. The Government of the United Kingdom, therefore, rejects as unfounded point 2 of the Spanish declaration'.

[134] Agreement regarding Gaza Strip and Jericho region (signed in 1994).

[135] Israeli-Palestinian Interim Agreement regarding the West Bank and the Gaza Strip (signed in 1995).

[136] *According to a factsheet published by the UN Office for the Coordination of Humanitarian Affairs - occupied Palestinian territory (available at http://www.ochaopt.org/documents/ocha_opt_gaza_blockade_factsheet_july_2013_english.pdf) a 6nm fishing limit has been enforced by the Israeli authorities.*

[137] UN DOALOS Table of claims to maritime jurisdiction (as at 15 July 2011) http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/table_summary_of_claims.pdf.

### 3.1.3 'Archaeological contiguous zones'

So-called 'archaeological contiguous zones', in the sense provided by Article 303(1) of UNCLOS have been claimed only by Algeria, Cyprus, France, Italy, Monaco and Tunisia.

### 3.1.4 Continental shelf claims

As with the territorial sea, a coastal State's rights over its continental shelf arise by operation of law.[138] Nevertheless in order to regulate activities taking place on its continental shelf a coastal State will usually need to adopt national legislation relating to the continental shelf. As can be seen from Table 1 most Mediterranean countries have done so.

### 3.1.5 EEZs and derivative zones

The process of analysing the current situation with regard to the establishment of EEZs and derivative zones in the Mediterranean is complicated by reason of the procedures whereby maritime zones are claimed. As described in section 2.5 above the first stage is usually the adoption by the coastal State in question of legislation that provides *inter alia* for the establishment of an EEZ or derivative zone.

In fact a majority of Mediterranean coastal States have such legislation in place. In the cases of Albania, Algeria, Croatia, Cyprus, Italy, Lebanon, Libya, Malta, Monaco, Montenegro, Slovenia, Syria and Tunisia geography dictates that such legislation can only be a precursor to the establishment of an EEZ or derivative zone in the Mediterranean given that these countries do not have land access to any other seas.

In the cases of countries which also have non-Mediterranean coastlines, France, Israel, Morocco and Spain also have legislation in place that provides for the establishment of EEZs or derivatives zones although as will be seen below not all of these countries have sought to establish full EEZs in the Mediterranean.

France has also put in place the relevant legislation to establish a full EEZ in the Mediterranean Sea (Law No. 76-665 of 16 July 1976) and declared in August 2009 (and officially to the UN in August 2010) its intention to create an EEZ in the Mediterranean (the *"décret"* to delimit the area is understood to be in the process of being developed).[139]

As regards Spain, Law No. 15/1978 on the Economic Zone is expressed to apply only to Spain's Atlantic coasts although powers are conferred on the Government to extend its provisions to other coasts of Spain.[140]

Egypt can also be included under this category of country (i.e. with both a Mediterranean and non-Mediterranean coast) although the legal mechanism whereby the Egyptian EEZ claim is made is not entirely clear: the only documents available at the UN DOALOS website in this respect are Egypt's declarations on signature and ratification as to the country's intention to claim an EEZ. Nevertheless Cyprus and Egypt have reached a formal agreement on the delimitation of their EEZ boundaries.

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[138] Provided an extended continental shelf is not claimed, not something that can happen in Mediterranean due to the breadth of the sea.

[139] *See the discussion in section 3.1.5.1 below on subsequent steps taken by France.*

[140] And indeed the 1978 Law on the Economic Zone also provided the legal basis for the adoption of Royal Decree 1315/1997, of 1 August 1997, establishing a Fisheries Protection Zone in the Mediterranean Sea which is discussed in more detail below. *See the discussion in section 3.1.5.1 on subsequent steps taken by Spain.*

Finally mention can be made of Turkey which has not only adopted legislation for the establishment of an EEZ in the Black Sea[141] (but not the Mediterranean) but also has taken steps to implement an EEZ there including as regards boundary de-limitation).

#### *3.1.5.1 Full EEZs[142]*

In practice progress as to the establishment of full EEZs varies. For example Monaco's Code of the Sea makes provision for Monaco to claim sovereign rights beyond its territorial sea which notion is broad enough to enable Monaco to claim an EEZ. No steps have been taken to introduce the subordinate legislation necessary to complete such a claim.

Similarly, Albania has legislation in place (in the form of the Law No. 8875 dated 4 April 2002 on the Establishment of the Coastguard) that provides for the establishment of an EEZ but no steps have yet been taken (in terms either of negotiations with adjacent/opposite States or the adoption of subordinate legislation) to put this into effect. By way of contrast Cyprus's EEZ legislation dates from 2004[143] and steps have been taken to establish and delineate the Cyprus EEZ.

As will be seen in subsequent paragraphs a number of Mediterranean countries have established derivative zones on the basis of legislation that is broad enough to permit the establishment of (full) EEZs but have actually claimed derivative zones.

Nevertheless with some exceptions (Algeria, Bosnia & Herzegovina (which in any event geographically precluded from claiming an EEZ) and Turkey (which is also a candidate for EU membership)) the majority of non-EU Mediterranean States have claimed an EEZ or have taken steps to do so.

For example Syria's EEZ law dates from 2003[144] Lebanon lodged the coordinates of its EEZ with the UN on 14 July 2010. Lebanon has also deposited with the UN a decree setting out the boundaries of its EEZ,[145] which was adopted on the basis of Law No. 163 dated 18 August 2011 on the delineation and declaration of the maritime regions of the Republic of Lebanon.

Croatia's Maritime Code actually provides for the establishment of a Croatian EEZ but as described below this has not yet been implemented. Montenegro too has in place legislation, in the form of the Law of the Sea, 2008[148] that provides for the establishment of EEZ but no steps have yet been taken to implement the relevant article, article 26.

[141] Turkey Decree of the Council of Ministers, No. 86/11264 dated 17 December 1986.

[142] *The most recent developments in terms of the establishment of full EEZs in the Mediterranean concern France and Spain. France claimed a Mediterranean EEZ on 12 October 2012 (Décret no. 2012-1148 du 12 octobre 2012 portant création d'une zone économique exclusive au large des côtes du territoire de la République en Méditerranée) on the basis of Law No. 76-665 of 16 July 1976 which was mentioned earlier in the text of this report. On 5 April 2013 Spain claimed an EEZ in the North West part of the Mediterranean Sea on the basis of a Royal Decree (Real Decreto 236/2013, de 5 de abril, por el que se establece la Zona Económica Exclusiva de España en el Mediterráneo noroccidental), which was adopted on the basis of Law No. 15/1978 on the Economic Zone.*

[143] Law to provide for the establishment of an EEZ 2.4.2004

[144] Law No. 28 dated 19 November 2003 'Definition Act on Internal Waters & Territorial Sea Limits of the Syrian Arab Republic'

[145] Decree No. 6433 Delineation of the boundaries of the exclusive economic zone of Lebanon.

[148] Law of the Sea ("OG CG", no. 17/07 i 6/08).

### *3.1.5.2 Fisheries zones (or fisheries protection zones)*

A number of Mediterranean States, including Tunisia, Malta, Algeria, Libya and Spain have over recent years declared derivative zones relating to fisheries. In some cases these fisheries zones have been superseded or complemented by EEZ declarations.

In 1997, Spain claimed a fishing protection zone in the Mediterranean (Royal Decree 1315/1997 of 1 August 1997, modified by Royal Decree 431/2000 of 31 March 2000) (Slim & Scovazzi, 2009[149]). The zone was delimited by Spain according to the lines that are claimed to be equidistant between Spain and the opposite or adjacent coasts of Algeria, Italy and France. No fisheries protection zone has, however, been established in the Alboran Sea, off the Spanish coast facing Morocco (Cacaud, 2005) meaning that stretch of remains an area of the high seas.[150]

With the exception of the French tuna fleet, no foreign vessels fish in the fisheries protection zone although technically the zone must be open to EU vessels under EU law, and as provided for in the Spanish Decree. The existence of the zone is not referred to in the Mediterranean fishery regulation.

In June 1994 (Decree No. 94-13), Algeria created a fishing zone whose extent is 32 n.m. from the maritime frontier with Morocco to Ras Ténés (036° 33' 20" N, 001° 22' 08" E) and 52 n.m. from Ras Ténés to the maritime frontier with Tunisia (Legislative Decree No. 94-13 of 28 May 1994). Foreign vessels are only able to fish in the area under an access agreement/licensing arrangement, which includes an inspection regime, a prohibition on transhipment at sea, an observer programme and position reporting (Cacaud, 2005).

Tunisia has established along its south eastern coastline (from Ras Kapoudia to the frontier with Libya) a fishing zone based on legislation dating back to 1951 (Decree of the Bey of Tunis of 26 July 1951) which was subsequently confirmed (Laws No. 63-49 of 30 December 1963 and No. 73-49 of 2 August 1973). This is the Mammellone ("Big Breast") area, a traditionally rich fishing ground for inshore trawlers. Foreign fishing vessels are prohibited from fishing in the area.

In 1979 Italy declared the Mammellone zone a repopulation area (although it still recognises the zone only as high seas) and prohibited Italian fishing from the zone. Italian (and other national vessels) continue to fish in the area outside Mammellone in the region unilaterally declared by Tunisia as an EEZ in 2005. Currently Italian (and some Maltese) vessels fishing for pink shrimp (Figure 3) and demersal fish (hake and mullet) do not enter this area, although fishing does take place all around the Mammellone area and shoreward of the midline delimitation agreed between Tunisia and Italy in respect of the Continental Shelf (20 August 1971).

Malta has claimed a fisheries protection zone since 1978 on the basis of the Territorial Waters and Contiguous Zone Amendment Act.[151] The existence of the zone was acknowledged at accession of Malta to the EU, although the Mediterranean fishery regulation recognises the zone as a “management zone” rather than a “fisheries zone”.

[149] Study of the current status of ratification, implementation and compliance with maritime agreements and conventions applicable to the Mediterranean region - Tables of participation to the relevant treaties” by Habib Slim & Tullio Scovazzi.

[150] *It is to be noted that this fisheries protection zone has been superseded, in part at least, by the Spanish EEZ in the North West part of the Mediterranean.*

[151] Since replaced by the Fishing Waters (Designation) and Extended Maritime Jurisdiction Act (Act No. X of 2005).

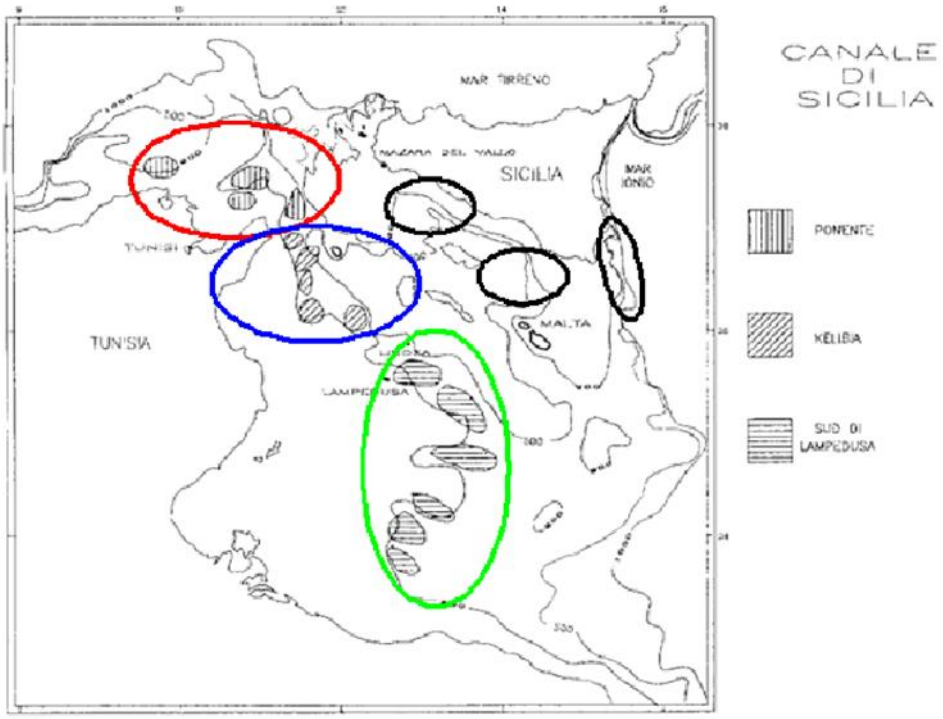


**Figure 3 Main fishing areas for pink shrimp in the Straits of Sicily. Source: GFCM assessment, 2010**

The 25nm breadth of the zone was chosen on biological grounds, and overlaps entirely the 24nm contiguous zone. The 25nm fisheries zone overlaps the mid-line agreement between Malta and Sicily (1970) which followed an exchange of *note verbales* between 1965 and 1970. This equidistant division, which applies only to the continental shelf, and therefore is not strictly relevant to the consideration of the Fisheries Zone (although it may become the basis for any discussions over EEZ midlines) is considered provisional by both parties, although in practice it has remained unmodified since 1970. It only extends for a short distance between Sicily and Malta.

In 2005, Libya established a fisheries protection zone whose limits extend seaward for a distance of 62 n.m. from the external limit of the territorial sea (General People's Committee Decision No. 37 of 24 February 2005), according to the geographical coordinates set forth in General People's Committee Decision No. 105 of 21 June 2005. This zone therefore extends 74nm from baselines

Foreign vessels are able to fish there (and they are only, as far as is known, interested in tuna fishing in the area) under permit and on payment of a licence fee.

On 3 October 2003, the Croatian Parliament adopted a "decision on the extension of the jurisdiction of the Republic of Croatia in the Adriatic Sea" and proclaimed "the content of the exclusive economic zone related to the sovereign rights for the purpose of exploring and exploiting, conserving and managing the living resources beyond the outer limits of the territorial sea, as well as the jurisdiction with regard to marine scientific research and the protection and preservation of the marine environment, whereby the ecological and fisheries protection zone of the Republic of Croatia is established as of today".

This zone follows the mid-line agreement made concerning the Continental Shelf delimitation agreement between Croatia and Italy (1968) and between Croatia and Bosnia-Herzegovina (1992). The boundary with Slovenia remains disputed. However, the Decision recognised the current boundaries as being temporary, "pending the conclusion of delimitation

agreements (paragraph 6 of the Decision). However, as of June 2004 the implementation of the zone were suspended with respect to Member States of the EU. The zone is still used extensively by the fishing vessels of other states, and particularly by Italian trawlers fishing for anchovy and demersal species. The rationale for the zone offered by Croatia is to conserve the nursery areas, particularly for hake and Nephrops which exist near the midline zone since Croatia reportedly only obtains a small proportion of the national catch within this zone and outside the territorial sea (see Section 6 below).

#### *3.1.5.3 Ecological protection zones*

Three countries, France, Italy and Slovenia, have established ecological protection zones.[152]

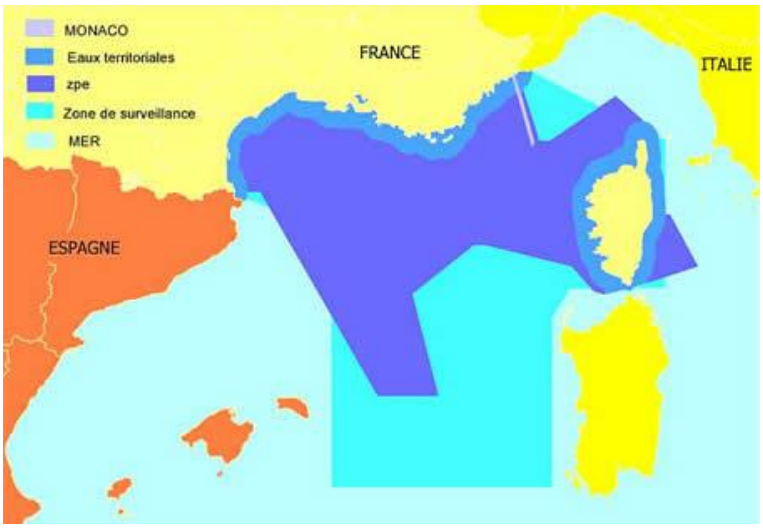


**Figure 4 The Zone de Protection Ecologique (in violet) declared by France in 2004**

The French EPZ came into being in January 2004[153] largely in response to the oil spill incident caused by the tanker ERIKA two years earlier. It was largely directed at preventing pollution form vessels and at the implementation of Protocol 3 in the Barcelona convention relating to such pollution. By bringing the zone within its jurisdiction it was able to monitor vessels by air and other means more effectively and to apply more firmly the legal instruments in French law that deal with these offences with the possibility of levying fines. The EPZ extended the scope of application of such legislation from 12 to 60nm.

A more detailed description of the French EPZ is contained in Section 9 below.

Italy adopted primary legislation in 2006[154] providing for the establishment of an ecological protection zone within which Italy will exercise powers which are not limited to the prevention and control of pollution, but extend also to the protection of marine mammals, biodiversity

[152] *As noted above France has now claimed an EEZ.*
[153] On the basis of Order No. 2004-33 applying Law No. 2003-346 dated 15 April 2003. Law No. 2003-346 in fact modified a number of articles contained in Law No. 76-665 of 16 July 1976 which provides the legal basis under domestic law for France's EEZ claims elsewhere and which as a result of Law No. 2003-34 was renamed 'Law No. 76-665 of 16 July 1976 on the economic zone and the ecological protection zone adjacent to the coasts of the territory of the republic'.
[154] Law 61 of 8 February 2006 on the establishment of an ecological protection zone beyond the outer limit of the territorial sea.

and the archaeological and historical heritage. This legislation was partially implemented in 2011 through the establishment of an EPZ in the Tyrrhenian Sea.[155]

Slovenia adopted legislation in 2005[156] for the establishment of an 'ecological protection zone' the scope of which is in fact broad enough to include fisheries matters. This was implemented in January 2006 by the 'Decree on the Implementation of the Fisheries Sea Area'.[157]

#### *3.1.5.4 Ecological and fisheries protection zone*

As noted above, Croatia's legislation, in the form of the Maritime Code, provides for the establishment of an EEZ. On 3 October 2003, the Croatian Parliament adopted a "decision on the extension of the jurisdiction of the Republic of Croatia in the Adriatic Sea" and proclaimed "the content of the Exclusive Economic Zone related to the sovereign rights for the purpose of exploring and exploiting, conserving and managing the living resources beyond the outer limits of the territorial sea, as well as the jurisdiction with regard to marine scientific research and the protection and preservation of the marine environment, whereby the ecological and fisheries protection zone of the Republic of Croatia is established as of today" (Art. 1).

Following negative reactions from other Adriatic States, however, a subsequent decision was taken later in 2003 by the Croatian Parliament to claim an ecological and fisheries protection zone (E&FPZ) also on the basis of the Maritime Code. Croatia, as an interim measure proposed the median line as the boundary of this zone pending negotiations with other Adriatic States. These coordinates were subsequently communicated to the UN. Following protests made by Italy and as a result of pressure from the EU, by a Decision of the Croatian Parliament dated 13 March 2008, decree was subsequently modified so as not to apply to fishing vessels of EU Member States.[158]

The Croatian rationale for declaring the EFPZ was to protect the nursery grounds of species such as hake and Nephrops which are said to occur in the deeper areas of the middle of the Adriatic.

## 3.2 Summary of maritime zones claimed in the Mediterranean Sea

The current position as regards national claims to maritime zones and related instruments; is set out in Table 1.

It is to be noted that this table lists national legislation adopted by States in connection with their respective maritime zone claims in the Mediterranean. In other words it does not seek to evaluate whether or not such claims are valid or validly made. The main source of information for the contents of this table is the 'Maritime Space: Maritime Zones and Maritime Delimitation' website[159] which is managed by DOALOS. However, as is noted on that website it does not always reflect the latest developments, especially those which have not been brought to the attention of DOALOS. Moreover as noted in section 2.5.3 above

[155] Decree of the President of the Republic establishing an ecological protection zone in the North West Mediterranean, of the Ligurian Sea and the Tyrrhenian Sea dated 6 October 2011.
[156] Law on the Proclamation of the Ecological Protection Zone and on the Continental Shelf adopted on 4 October 2005.
[157] 5 January 2006.
[158] Vidas, D. 'The UN Convention on the Law of the Sea, the European Union and the Rule of Law: What is going on in the Adriatic Sea?' 24 *International Journal of Marine and Coastal Law* (2009), 1-66.
[159] http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/europe.htm

coastal States including those in the Mediterranean do not always promptly lodge charts and other data with DOALOS. Consequently Table 1, is based not only on a literature review but also on meetings held with government officials in the Mediterranean coastal States during the preparation of this Study. More specifically the information that differs from that contained on the DOALOS website was obtained from the governments concerned.

The different types of claimed maritime zones are listed in the second column. Column three identifies simply whether or not there is national legislation in force relating to each type of zone while the name of the relevant legal instrument is set out in column four for each type of maritime zone. Comments, if any, on the legislation or its status are contained in column five while column six indicates whether or not the relevant national instrument has been notified to DOALOS. Entries in this column are either 'yes' or 'no' or 'N/A' (non/applicable): if no relevant legislation has been adopted then logically it cannot be notified to DOALOS.

**Table 1 Claims to maritime zones and related national instruments[160] [161]**

| | Maritime zone | Applicable national legislation | Instrument | Legislation Status/comments | Notified to the UN |
|---|---|---|---|---|---|
| **Albania** | (a) Territorial sea | Yes | Law on the State Border 2008 | | No |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Law No. 7867, dated October 12 1994 On the protection of movable and immovable cultural property | | No |
| | (e) EEZ or derivative zone | Yes | Law No. 8875 of 4.4.2002 on the Establishment of the Coastguard | No steps yet taken to implement an EEZ. | No |
| **Algeria** | (a) Territorial sea | Yes | Decree No. 63-403 of 12 October 1963 establishing the Breadth of the Territorial Waters | | Yes |
| | (b) Contiguous zone | Yes | Presidential Decree no. 04-304 of 6 November 2004, published in *Journal Officiel de la République Algerienne*, no. 70, 7 November 2004. | | Yes |
| | (c) 'Archaeological contiguous zone' | Yes | Presidential Decree no. 04-304 of 6 November 2004, published in *Journal Officiel de la République Alg´erienne*, no. 70, 7 November 2004. | | Yes |
| | (d) Continental shelf | | Not known. | | No |
| | (e) EEZ or derivative zone | Yes | Legislative Decree No. 94-13 of 17 Dhu'lhijjah 1414, corresponding to 28 | Reserved fishing zone – breadth from baseline: 32 nm between the western | Yes |

[160] The UK claim in respect of Gibraltar is included in this list, however it shall be taken into account that it has been contested by Spain as explained in paragraph 3.1.1 of this document. Furthermore, Palestine has been included in this list in order to be exhaustive; however this designation is without prejudice to positions on the recognition of Palestine as a state.

[161] Shaded box in column 1 means not party to UNCLOS.

| | | | | | |
|---|---|---|---|---|---|
| | | | May 1994, establishing the general rules relating to fisheries, 22 June 1994 | maritime border and Ras Ténès and 52 nm between Ras Ténès and the eastern maritime border. | |
| **Bosnia & Herzegovina** | (a) Territorial sea | No | | | N/A |
| | (b) Contiguous zone | No | | | N/A |
| | (c) 'Archaeological contiguous zone' | No | | | N/A |
| | (d) Continental shelf | No | | | N/A |
| | (e) EEZ or derivative zone | No | | | N/A |
| **Croatia** | (a) Territorial sea | Yes | Maritime Code, 1994 | | Yes |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Maritime Code, 1994 | | Yes |
| | (e) EEZ or derivative zone | Yes | EEZ - Maritime Code, 1994 | Implemented through the Decision on the Extension of the Jurisdiction of the Republic of Croatia in the Adriatic Sea adopted on 3 October 2003 and subsequently amended on 3 June 2004 and 15 December 2006 | Yes |
| **Cyprus** | (a) Territorial sea | Yes | Treaty concerning the Establishment of the Republic of Cyprus (Annex A) 19 August 1960 | Coordinates notified to UN. | Yes |
| | (b) Contiguous zone | Yes | Law to provide for the establishment of a contiguous zone 2 April 2004 | | Yes |
| | (c) 'Archaeological contiguous zone' | Yes | Law to provide for the establishment of a contiguous zone 2 April 2004 | | Yes |
| | (d) Continental shelf | Yes | Continental Shelf Law, Law No. 8 of 5 April 1974 | | Yes |
| | (e) EEZ or derivative zone | Yes | Law to provide for the establishment of an EEZ 2.4.2004 | | Yes |
| **Egypt** | (a) Territorial sea | Yes | Decree concerning the Territorial Waters of the Arab Republic of Egypt of | | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | 15 January 1951, as amended by Presidential Decree of 17 February 1958 | | |
| | (b) Contiguous zone | Yes | Declaration on ratification that the contiguous zone (as defined in the Ordinance of 18 January 1951 as amended by the Presidential Decree of 17 February 1958) extends to 24 nautical miles from the baselines from which the breadth of the territorial sea is measured, as provided for in article 33 of the Convention. | | Yes |
| | (c) 'Archaeological contiguous zone' | No | | | No |
| | (d) Continental shelf | Yes | Presidential Decree No. 1051 of 1958 concerning the Contintental Shelf | | Yes |
| | (e) EEZ or derivative zone | | Declaration on ratification: the Arab Republic of Egypt will exercise as from this day the rights attributed to it by the provisions of Parts V and VI of the United Nations Convention on the Law of the Sea in the exclusive economic zone situated beyond and adjacent to its territorial sea in the Mediterranean Sea and in the Red Sea. 17 February 2003 | | N/A |
| **France** | (a) Territorial sea | Yes | Law No. 71-1060 of 24 December 1971 regarding the delimitation of French territorial waters | | Yes |
| | (b) Contiguous zone | Yes | Law No. 87-1151 of 31 December 1987 on the fight against drug trafficking and modifying certain provisions of the Penal Code | | Yes |
| | (c) 'Archaeological contiguous zone' | Yes | Act No. 89-874 of 1 December 1989 concerning Maritime Cultural | | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | Assets and amending the Act of 27 September 1941 Regulating Archaeological Excavations of 1 December 1989 | | |
| | (d) Continental shelf | Yes | Law No. 68-1181 of 30 December 1968 relating to the exploration of the Continental Shelf and to the exploitation of its natural resources as amended | | Yes |
| | (e) EEZ or derivative zone | Yes | Law No. 76-665 of 16 July 1976 on the economic zone and the ecological protection zone adjacent to the coasts of the territory of the republic'<br>** Decree No. 2012-1148 on the creation of an Exclusive Economic Zone along the Mediterranean coasts of the French Republic* | **Coordinates deposited with the UN on 22 February 2013* | Yes |
| **Greece** | (a) Territorial sea | Yes | Law No. 230 of 17 September 1936 | Sets the breadth 6 nm | Yes |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Decree-Law No. 142/1969 Concerning Exploration for and Exploitation of the Mineral Resources in the Sea-Bed and the Beds of Lakes | | Yes |
| | (e) EEZ or derivative zone | No | - | | N/A |
| **Israel** | (a) Territorial sea | Yes | Territorial Waters Law, 5717/1956, as amended by the Territorial Waters (Amendment) Law, 5750-1990, of 5 February 1990 | As further defined in the Interpretation Law No. 5741/1981 | Yes |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |

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| | (d) Continental shelf | Yes | Submarine Areas Law of 10 February 1953 | Predating UNCLOS the act makes a territorial claim to the seabed (as opposed to a claim to sovereign rights) while recognising superjacent waters as high seas | Yes |
| | (e) EEZ or derivative zone | Yes | | | Yes |
| **Italy** | (a) Historic Bay Claim | Yes | Gulf of Taranto | Subject to protests from USA, UK | |
| | (b) Territorial sea | Yes | Navigation Code of 30 March 1942, as amended by Law No. 359 of 14 August 1974, Law No. 1658 of 8 December 1961 authorizing accession to the Convention on the Territorial Sea and the Contiguous Zone, adopted at Geneva on 29 April 1958, and giving effect to that Convention | Implemented by Decree of the President of the Republic No. 816 of 26 April 1977 containing regulations concerning the application of Law No. 1658 of 8 December 1961 authorizing accession to the Convention on the Territorial Sea and the Contiguous Zone, adopted at Geneva on 29 April 1958, and giving effect to that Convention | Yes |
| | (c) Contiguous zone | Yes | Navigation Code of 30 March 1942, as amended by Law No. 359 of 14 August 1974, Law No. 1658 of 8 December 1961 authorizing accession to the Convention on the Territorial Sea and the Contiguous Zone, adopted at Geneva on 29 April 1958, and giving effect to that Convention | | Yes |
| | (d) 'Archaeological contiguous zone' | Yes | Decree no. 42 of 22 January 2004, in *Gazzetta Ufficiale della Repubblica Italiana*, no. 45, suppl. ord., 24 February 2004. | | No |
| | (e) Continental shelf | Yes | Act No. 6l3 on the Surveying and Production of Oil and Gas in the Territorial Sea and Continental Shelf, and Amendments to Act No. 6 | | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | of ll January l967 on the Surveying and Production of Oil and Gas | | |
| | (f) EEZ or derivative zone | Yes | Law 61 of 8 February 2006 on the establishment of an ecological protection zone beyond the outer limit of the territorial sea. Implemented through Decree of the President of the Republic establishing an ecological protection zone in the North West Mediterranean, of the Ligurian Sea and the Tyrrhenian Sea dated 6 October 2011 | | No |
| **Lebanon** | (a) Territorial sea | Yes | Legislative Decree No. 138 concerning territorial waters and sea areas, of 7 September 1983 | | Yes |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | - | Un-known. | | |
| | (e) EEZ or derivative zone | Yes | Decree No. 6433 Delineation of the boundaries of the exclusive economic zone of Lebanon; Law No. 163 dated 18 August 2011 (Delineation and declaration of the maritime regions of the Republic of Lebanon) | Coordinates deposited with UN DOALOS on 14 July 2010 | Yes |
| **Libya** | (a) Historic Bay Claim | Yes | Gulf of Sirte Claim United Nations, Legislative Series, ST/LEG/SER.B/18, p. 26 | | Yes |
| | (b) Territorial sea | Yes | Act No. 2 of 18 February 1959 concerning the delimitation of Libyan territorial waters | | Yes |
| | (c) Contiguous zone | No | - | | N/A |
| | (d) 'Archaeological contiguous | No | - | | N/A |

| | | | | | |
|---|---|---|---|---|---|
| | zone' | | | | |
| | (e) Continental shelf | - | Unknown. | | No |
| | (f) EEZ or derivative zone | Yes | FPZ - General People's Committee Decision No. 37 of 1373 from the death of the Prophet (AD 2005) concerning the declaration of a Libyan fisheries protection zone in the Mediterranean Sea | Extends out to 65 nm from the baselines | Yes |
| | | | EEZ - General People's Committee Decision No. 260 of A.J. 1377 (A.D. 2009) concerning the declaration of the exclusive economic zone of the Great Socialist People's Libyan Arab Jamahiriya | | Yes |
| **Malta** | (a) Territorial sea | Yes | Territorial Waters And Contiguous Zone Act, 10th December, 1971 as amended | | Yes |
| | (b) Contiguous zone | Yes | Territorial Waters and Contiguous Zone Act, 10th December, 1971 as amended | | Yes |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Continental Shelf Act 29th July, 1966 as amended | | Yes |
| | (e) EEZ or derivative zone | Yes | Fishing Waters (Designation) and Extended Maritime Jurisdiction Act (Act No. X of 2005) | | No |
| **Monaco** | (a) Territorial sea | Yes | Act No. 1,198 of 27 March 1998 containing the Code of the Sea | Implemented through Sovereign Ordinance No. 5094 delimiting the Territorial Waters of Monaco, of 14 February 1973 | Yes |
| | (b) Contiguous zone | Yes | Act No. 1,198 of 27 March 1998 containing the Code of the Sea | Code makes provision for such a claim | Yes |
| | (c) 'Archaeological contiguous zone' | Yes | Act No. 1,198 of 27 March 1998 containing the Code of the Sea | Code makes provision for such a claim | Yes |
| | (d) Continental shelf | Yes | Act No. 1,198 of 27 March 1998 containing the Code | The Code makes provision for Monaco to claim | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | of the Sea | sovereign rights beyond its territorial sea. | |
| | (e) EEZ or derivative zone | Yes | Act No. 1,198 of 27 March 1998 containing the Code of the Sea | The Code makes provision for Monaco to claim sovereign rights beyond its territorial sea. | Yes |
| **Montenegro** | (a) Territorial sea | Yes | Maritime & Inland Navigation Law, 12/98 | | No |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Law of the Sea, 2008 | | No |
| | (e) EEZ or derivative zone | Yes | Law of the Sea, 2008 | | No |
| **Morocco** | (a) Territorial sea | Yes | Dahir concerning Act No. 1-73-211 of 26 Muharran 1393 (2 March 1973) establishing the limits of the territorial waters and the Exclusive Fishing Zone | | Yes |
| | (b) Contiguous zone | Yes | Act No 1-81 of 18 December 1980, Promulgated by Dahir No. 1-81-179 of 8 April 1981 | | Yes |
| | (c) 'Archaeological contiguous zone' | No | | | N/A |
| | (d) Continental shelf | - | Not known. | | No |
| | (e) EEZ or derivative zone | Yes | EFZ - Dahir concerning Act No. 1-73-211 of 26 Muharran 1393 (2 March 1973) establishing the limits of the territorial waters and the Exclusive Fishing Zone<br><br>EEZ - Act No 1-81 of 18 December 1980, Promulgated by Dahir No. 1-81-179 of 8 April 1981 | | Yes |
| **Palestine** | (a) Territorial sea | Yes | The 1995 Israeli-Palestinian Interim Agreement regarding the West Bank and the Gaza Strip states that the territorial jurisdiction | | - |

| | | | | | |
|---|---|---|---|---|---|
| | | | of the Council/Palestinian Authority includes the 'territorial waters' (Art. XVII (2)(a)) | | |
| | (b) Contiguous zone | No | | | - |
| | (c) 'Archaeological contiguous zone' | No | | | - |
| | (d) Continental shelf | No | | | - |
| | (e) EEZ or derivative zone | | Map 8 attached to the Interim Agreement shows a 'Maritime Activities Zone' which in turn shows a 20 nm Fishing Zone. | | - |
| **Slovenia** | (a) Territorial sea | Yes | Maritime Code 2001, as amended | | Yes |
| | (b) Contiguous zone | No | - | | N/A |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Ecological Protection Zone and Continental Shelf of the Republic of Slovenia Act adopted on 4 October 2005 | | Yes |
| | (e) EEZ or derivative zone | Yes | Ecological Protection Zone and Continental Shelf of the Republic of Slovenia Act adopted on 4 October 2005 | | Yes |
| **Spain** | (a) Territorial sea | Yes | Act No. 10/1977 of 4 January 1977 | | Yes |
| | (b) Contiguous zone | Yes | Act No. 27/1992 of 24 November 1992 concerning national ports and merchant shipping | | Yes |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | - | Not known | | No |
| | (e) EEZ or derivative zone | Yes | Act No. 15/1978 on the Economic Zone of 20 February 1978 | | Yes |
| | | | Royal Decree 1315/1997, of 1 August 1997, establishing a Fisheries Protection Zone in the | List of geographical coordinates of points constituting the delimitation made by Spain of the Fisheries Protection Zone in | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | Mediterranean Sea | the Mediterranean Sea, established by Royal Decree 1313/1997 of 1 August 1997 | |
| | | | **Royal Decree 236/2013, of 5 April establishing the Spanish Exclusive Economic Zone in the North West Mediterranean* | | No |
| **Syria** | (a) Territorial sea | Yes | Law No. 28 dated 19 November 2003 'Definition Act on Internal Waters & Territorial Sea Limits of the Syrian Arab Republic' | | Yes |
| | (b) Contiguous zone | Yes | Law No. 28 dated 19 November 2003 'Definition Act on Internal Waters & Territorial Sea Limits of the Syrian Arab Republic' | | Yes |
| | (c) 'Archaeological contiguous zone' | No | - | | N/A |
| | (d) Continental shelf | Yes | Law No. 28 dated 19 November 2003 'Definition Act on Internal Waters & Territorial Sea Limits of the Syrian Arab Republic' | | Yes |
| | (e) EEZ or derivative zone | Yes | Law No. 28 dated 19 November 2003 'Definition Act on Internal Waters & Territorial Sea Limits of the Syrian Arab Republic' | | Yes |
| **Tunisia** | (a) Territorial sea | Yes | Act No. 73-49 delimiting the territorial waters, of 2 August 1973 | | Yes |
| | (b) Contiguous zone | Yes | Law no. 86–35 of 9 May 1986, in *Journal Officiel de la Republique Tunisienne*, no. 31, 13–16 May 1986. | | Yes |
| | (c) 'Archaeological contiguous zone' | Yes | Law no. 86–35 of 9 May 1986, in *Journal Officiel de la Republique Tunisienne*, no. 31, 13–16 May 1986. | | Yes |
| | (d) Continental shelf | - | Not known. | | No |
| | (e) EEZ or derivative zone | Yes | Act No. 50/2005 dated 27 June 2005 concerning the | | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | | | exclusive economic zone off the Tunisian coasts | | |
| **Turkey** | (a) Territorial sea | Yes | Act No. 2674 of 20 May 1982, on the Territorial Sea of the Republic of Turkey | 6 nm except as extended (as is the case in the Black Sea) | Yes |
| | (b) Contiguous zone | No | | | N/A |
| | (c) 'Archaeological contiguous zone' | No | | | N/A |
| | (d) Continental shelf | - | Not known | | |
| | (e) EEZ or derivative zone | No | | | N/A |
| **United Kingdom – Sovereign Base Areas of Akrotiri and Dhekelia** | (a) Territorial sea | No | No | | No |
| | (b) Military base area | Yes | Treaty concerning the Establishment of the Republic of Cyprus (Annex A) 19 August 1960 (territorial sea) | | Yes |
| | (c) Contiguous zone | No | | | N/A |
| | (d) 'Archaeological contiguous zone' | No | | | N/A |
| | (e) Continental shelf | No | | | |
| | (f) EEZ or derivative zone | No | | | N/A |
| **United Kingdom - Gibraltar** | (a) Territorial sea | Yes | Interpretation & General Clauses Act 1962 and other references in legislation | | No |
| | (b) Contiguous zone | No | | | N/A |
| | (c) 'Archaeological contiguous zone' | No | | | N/A |
| | (d) Continental shelf | No | | | N/A |
| | (e) EEZ or derivative zone | No | | | N/A |

## 3.3 The boundaries of maritime zones in the Mediterranean Sea

The situation as regards the delimitation of the boundaries of maritime zones in the Mediterranean Sea is also somewhat complex.

In terms of the boundaries of territorial seas, with the exception of those relatively few places where States face each other across a stretch of water less than 24 nm broad, boundary delimitations relate to the territorial sea concern neighbouring States. For example Slovenia

has an agreed northern boundary with Italy from an earlier agreement between Italy and Yugoslavia.

Nevertheless as can be seen from Table 2 a number of territorial sea boundaries remain to be agreed/adjudicated. For example the southern boundary of the Slovenian territorial sea is not agreed with Croatia and will be the subject of an Arbitration Tribunal established upon the signature of the Croatian Accession Treaty.

Similarly the maritime boundary between Croatia and Bosnia & Herzegovina has yet to be determined. Due to the narrowness of the Channel of Mali Ston, which separates the Bosnia & Herzegovina coast from the Croatian peninsular that faces it, suggests that the territorial sea of the former would be somewhat narrower than 12 nm.

Mention can also be made of the maritime boundaries between Albania and Greece. After lengthy negotiations an agreement reached 27 April 2009 between the two countries regarding their territorial sea and continental shelf boundaries was annulled by Albania's Constitutional Court in 2010.

As can also be seen from Table 2, a number of continental shelf boundaries have been agreed on a bilateral level. The continental shelf boundaries between Libya and Tunisia and between Libya and Malta were the subject of proceedings before the ICJ.[162] It does not appear that there have been adjudications on any other continental shelf boundaries.

Cyprus has reported having negotiated the maritime boundaries of its EEZ with Egypt, Israel and Lebanon[163] (although Turkey has challenged Cyprus's right to unilaterally claim an EEZ).

Lebanon lodged the coordinates of its EEZ with the UN on 14 July 2010. Lebanon has also deposited with the UN a decree setting out the boundaries of its EEZ[165] which was adopted on the basis of Law No. 163 dated 18 August 2011 on the delineation and declaration of the maritime regions of the Republic of Lebanon.

Nevertheless as can be seen from Table 2, which seeks to set out the current position with regard to the boundaries of claimed maritime zones in the Mediterranean, a significant number of maritime boundaries have yet to be notified to the UN.

The third column contains comments on boundary delimitations while the next three columns describe the type of claimed maritime zones in respect of which boundaries fail to be determined. In cases where a boundary has been delimited the relevant box is marked ●. Where a given boundary has not been delimited the box is left empty. Where there are no common boundaries for a particular type of maritime zone (e.g. in the case of Albania and Italy where the respective territorial seas do not abut each other) the relevant box is marked N/A. The final column indicates whether or not details of the boundary delimitation and/or coordinates have been notified to the UN. Where the boundary delimitation process is not concluded this column is marked N/A.

[162] Case concerning the Continental Shelf (Libyan Arab Jamahiriya/Malta) http://www.icj-cij.org/docket/files/68/9565.pdf. Case concerning the Continental Shelf (Libyan Arab Jamahiriya/Tunisia)http://www.icj-cij.org/docket/index.php?p1=3&p2=3&code=tltl&case=71&k=05&p3=0.

[163] See the website of the Cyprus Ministry of Commerce, Industry and Tourism http://www.mcit.gov.cy/mcit/mcit.nsf/All/A6D222B09D72E659C2257441002EE9BE?OpenDocument. It does not appear that the agreement with Lebanon has been ratified yet.

[165] Decree No. 6433 Delineation of the boundaries of the exclusive economic zone of Lebanon.

**Table 2 The boundaries of maritime zones claimed in the Mediterranean[167] [168]**

| | | | | | | |
|---|---|---|---|---|---|---|
| | **Adjacent/ opposite coastal States/entities** | **Boundary delimitations and comments** | **Territorial sea** | **Continental Shelf** | **EEZ or derivative zone** | **Notified to UN** |
| Albania | Italy | Continental shelf delimitation agreement, 18/12/92 based on median line. | N/A | ● | | Yes |
| | Greece | Territorial sea and continental shelf boundary agreement concluded but rejected by the Albanian Constitutional Court | ● | ● | | N/A |
| | Montenegro | Preliminary discussions on delimitation of the territorial sea and continental shelf boundaries | | | | N/A |
| Algeria | Italy | - | | | | |
| | Morocco | - | | | | |
| | Spain | - | | | | |
| | Tunisia | Agreement on Provisional Arrangements for the Delimitation of the Maritime Boundaries between the Republic of Tunisia and the People's Democratic Republic of Algeria (with annex of 7 August 2002), 11 February 2002 | ● | ● | | Yes |
| Bosnia & Herzegovina | Croatia | Treaty on the State Border between the Republic of Croatia and Bosnia and Herzegovina, 30 July 1999 (yet to be ratified by either party) | . | N/A | | Yes |
| Croatia | Bosnia & Herzegovina | Treaty on the State Border between the Republic of Croatia and Bosnia and Herzegovina, 30 July 1999 (yet to be ratified by either party) | ● | N/A | | Yes |
| | Italy | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Croatia as successor) | N/A | ● | | Yes |
| | Montenegro | Interim border regime Protocol 2002 – territorial sea and continental shelf | ● | | | No |
| | Slovenia | Maritime (and related land) boundaries subject to arbitration | | | | N/A |
| Cyprus | Egypt | Agreement between the Republic of Cyprus and the Arab Republic of Egypt on the Delimitation of the Exclusive Economic Zone 17 February 2003 | N/A | | ● | Yes |
| | Israel | Agreement between the Government of the State of Israel and the | N/A | | | Yes |

[167] The UK claim in respect of Gibraltar is included in this list, however it shall be taken into account that it has been contested by Spain as explained in paragraph 3.1.1 of this document. Furthermore, Palestine has been included in this list in order to be exhaustive; however this designation is without prejudice to positions on the recognition of Palestine as a state.

[168] Shaded box in column 1 means not party to UNCLOS.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Government of the Republic of Cyprus on the Delimitation of the Exclusive Economic Zone, signed in Nicosia on 17 December 2010 (entry into force: 25 February 2011; registration #:I-48387 ; registration date: 9 March 2011; link to UNTS) (pdf file, Annex II) | | | | |
| | Greece | | N/A | | | |
| | Lebanon | Agreement between the Republic of Cyprus and Lebanon on the Delimitation of the Exclusive Economic Zone, January 2007[169] | N/A | | ● | No |
| | Syria | Preliminary discussions on maritime boundaries | N/A | | | |
| | Turkey | | N/A | | | |
| | UK | Treaty concerning the Establishment of the Republic of Cyprus (Annex A) 19 August 1960 (territorial sea) | ● | | | Yes |
| Egypt | Cyprus | Agreement with Egypt on EEZ delimitation of the Exclusive Economic Zone 17 February 2003 | N/A | | ● | Yes |
| | Israel | | | | | |
| | Greece | Preliminary discussions on the Delimitation of the Exclusive Economic Zone | | | | N/A |
| | Libya | | N/A | | | |
| | Turkey | Preliminary discussions on the Delimitation of the Exclusive Economic Zone | N/A | | | |
| France | Italy | Agreement between the Government of the French Republic and the Government of the Italian Republic on the Delimitation of the Maritime Boundaries in the Area of the Strait of Bonifacio, 28 November 1986 | ● | | | Yes |
| | Monaco | Agreement on Maritime Delimitation dated 16 February 1984 | ● | | | Yes |
| | Spain | | | | | |
| Greece | Albania | Territorial sea and continental shelf boundary agreement concluded but rejected by the Albanian Constitutional Court | ● | ● | | No |
| | Cyprus | | N/A | | | |
| | Egypt | Preliminary discussions on EEZ delimitation | N/A | | | |
| | Italy | Agreement between the Hellenic Republic and the Italian Republic on the Delimitation of the Respective Continental Shelf Areas of the two States, 24 May 1977 | | ● | | Yes |
| | Libya | | N/A | | | |
| | Turkey | | | | | |
| Israel | Cyprus | Agreement between the Government of the State of Israel and the | N/A | | | Yes |

[169] Subject to ratification.

| | | | | | | |
|---|---|---|---|---|---|---|
| | | Government of the Republic of Cyprus on the Delimitation of the Exclusive Economic Zone, signed in Nicosia on 17 December 2010 (entry into force 25 February 2011) | | | | |
| | Egypt | | | | | |
| | Lebanon | | | | | |
| | Palestine | The 1995 Israeli-Palestinian Interim Agreement regarding the West Bank and the Gaza Strip | ● | | ● | - |
| Italy | Albania | Continental shelf delimitation agreement, 18/12/92 based on median line | N/A | ● | | Yes |
| | Algeria | | N/A | | | |
| | Croatia | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Croatia as successor) | N/A | ● | | Yes |
| | France | Agreement between the Government of the French Republic and the Government of the Italian Republic on the Delimitation of the Maritime Boundaries in the Area of the Strait of Bonifacio, 28 November 1986 | ● | | | Yes |
| | Greece | Agreement between the Hellenic Republic and the Italian Republic on the Delimitation of the Respective Continental Shelf Areas of the two States 24 May 1977 | N/A | ● | | Yes |
| | Libya | | N/A | | | |
| | Malta | | N/A | | | |
| | Montenegro | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Montenegro as successor) | N/A | ● | | Yes |
| | Slovenia | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Slovenia as successor) | | ● | | Yes |
| | Spain | Convention between Spain and Italy on the Delimitation of the Continental Shelf between the two States 19 February 1974 | N/A | ● | | Yes |
| | Tunisia | Agreement between the Government of the Republic of Tunisia and the Government of the Italian Republic concerning the Delimitation of the Continental Shelf between the two Countries 20 August 1971 | N/A | ● | | Yes |
| Lebanon | Cyprus | Agreement between the Republic of Cyprus and Lebanon on the Delimitation of the Exclusive Economic Zone, January 2007[170] | N/A | | ● | |
| | Israel | | | | | |
| | Syria | | | | | |
| Libya | Egypt | | | | | |
| | Greece | | N/A | | | |

[170] Subject to ratification.

| | | | | | | |
|---|---|---|---|---|---|---|
| | Italy | | N/A | | | |
| | Malta | Agreement between the Great Socialist People's Libyan Arab Jamahariya and the Republic of Malta implementing Article III of the Special Agreement and the Judgment of the International Court of Justice,10 November 1986(1) | N/A | ● | | Yes |
| | Tunisia | Agreement between the Libyan Arab Socialist People's Jamahariya and the Republic of Tunisia to Implement the Judgment of the International Court of Justice in the Tunisia/Libya Continental Shelf Case, 8 August 1988 | | ● | | Yes |
| Malta | Italy | | N/A | | | |
| | Libya | Agreement between the Great Socialist People's Libyan Arab Jamahariya and the Republic of Malta implementing Article III of the Special Agreement and the Judgment of the International Court of Justice,10 November 1986(1) | N/A | ● | | Yes |
| | Tunisia | | N/A | | | |
| Monaco | France | Agreement on Maritime Delimitation dated 16 February 1984 | ● | | | Yes |
| Montenegro | Albania | Preliminary discussions on delimitation of the territorial sea and continental shelf boundaries | | | | |
| | Croatia | Interim border regime Protocol 2002 – territorial sea and continental shelf | ● | ● | | |
| | Italy | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Montenegro as successor) | N/A | ● | | Yes |
| Morocco | Algeria | | | | | |
| | Spain | | | | | |
| Palestine | Israel | The 1995 Israeli-Palestinian Interim Agreement regarding the West Bank and the Gaza Strip | ● | | ● | - |
| Slovenia | Croatia | Subject to arbitration (land border and territorial sea) | | | | |
| | Italy | Continental Shelf - Agreement between Italy and Yugoslavia of 8 January 1968 (Slovenia as successor) | | ● | | Yes |
| Spain | Algeria | | | | | |
| | France | | | | | |
| | Italy | Convention between Spain and Italy on the Delimitation of the Continental Shelf between the two States 19 February 1974 | N/A | ● | | Yes |
| | UK | | | | | |
| | Morocco | | | | | |
| Syria | Cyprus | Preliminary discussions on maritime boundaries. | N/A | | | |
| | Lebanon | | | | | |
| | Turkey | Preliminary discussions on maritime boundaries. | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tunisia | Algeria | Agreement on provisional arrangements for the delimitation of the maritime boundary between the Republic of Tunisia and the People's Democratic Republic of Algeria (with annex of 7 August 2002). Algiers, 11 February 2002 | ● | ● | | |
| | Italy | Agreement between the Government of the Republic of Tunisia and the Government of the Italian Republic concerning the Delimitation of the Continental Shelf between the two Countries<br>20 August 1971 | N/A | ● | | Yes |
| | Malta | | N/A | | | |
| | Libya | Agreement between the Libyan Arab Socialist People's Jamahariya and the Republic of Tunisia to Implement the Judgment of the International Court of Justice in the Tunisia/Libya Continental Shelf Case 8 August 1988 | | ● | | |
| Turkey | Cyprus | | N/A | | | |
| | Egypt | Preliminary discussions on maritime boundaries | N/A | | | |
| | Greece | | | | | |
| | Syria | Preliminary discussion on maritime boundaries | | | | |
| United Kingdom | Cyprus | Treaty concerning the Establishment of the Republic of Cyprus (Annex A) 19 August 1960 (territorial sea) | ● | | | |
| | Spain | | | | | |

## 3.4 Other maritime areas in the Mediterranean

### 3.4.1 Marine Protected Areas

A large number of MPAs have been established in the Mediterranean to date, the vast majority of which are located within areas under coastal State jurisdiction, namely the territorial sea. Nevertheless a range of steps are planned or have been undertaken for the establishment of both high seas MPAs and transboundary MPAs.

#### *3.4.1.1 High-seas/transboundary MPAs*

The Pelagos Sanctuary for Mediterranean Marine Mammals (the 'Pelagos Sanctuary') is believed to be the first example of a high seas MPA in the world.

The core of the Sanctuary extends over 87.500 $km^2$ in the north-western Mediterranean Sea between Italy, France and the island of Sardinia (Figure 5) but with the surrounding area covers almost 2.5 million $km^2$. The area encompasses Corsica and the Archipelago Toscano.


**Figure 5 The Pelagos Sanctuary: image taken from Tethys Research Institute website, http://www.tethys.org/sanctuary.htm [accessed 13/02/2011]**

A full description of the Pelagos Sanctuary is contained in section 9.2 below.

#### *3.4.1.2 Proposed transboundary MPAs*

Apart from the Pelagos Sanctuary, a number of transboundary MPAs have been proposed for the Mediterranean.

##### 3.4.1.2.1 **ACCOBAMS**

The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS) is a biodiversity conservation tool based on co-operative action using largely the mechanisms of the Barcelona Convention in the Mediterranean. Its purpose is to reduce threats to cetaceans notably by improving existing knowledge of the animals. The main process for conservation related to use of the SPAMI under the SPA Protocol (Slim, 2001)[171].

In considering criteria for protected areas, ACCOBAMS took account of the fact that large areas may be important at some level to cetaceans but not all areas can be protected. The aim should be to protect the most important habitat/areas. The challenge is to identify which are the most important habitats or areas. It is also important to realise that whales move over large areas and thus the concept of a standalone conservation area may be of limited value. Thus, knowledge of aspects of the life history of the most important whales is necessary in order to determine:

- Areas used by cetaceans for feeding, breeding, calving, nursing and social behaviour;
- Migration routes and corridors and related resting areas;

[171] Slim, H. (2001). *Les aires specialement protegées en Mediterranée*. Institute du Droit Economique de la Mer (INDEMER) Actes du Colloque 6: 121 – 139.

- Areas where there are seasonal concentrations of cetacean species;
- Areas of importance to cetacean prey;
- Natural processes that support continued productivity of cetacean foraging species (upwellings, fronts, etc.);
- Topographic structures favourable for enhancing foraging opportunities for cetacean species (canyons, seamounts).

Such understanding can give the understanding to protect specific key areas which are vital to whales at significant points in their lives.

Then, again, such knowledge has to be set against the positions of the most likely threats so that the locational and risk information on such things as:

- Conflicts between cetaceans and fishing activities;
- Significant areas of frequent bycatch of cetaceans;
- Intensive whale watching or other marine tourism activities;
- Navigation as a potential threat to cetaceans;
- Pollution runoff, outflow or other marine dumping sources;
- Military exercises

The spatial modelling approach is a powerful tool in this regard. Cetacean protection would be greatly assisted by Marine Spatial Planning under the Maritime Strategy for example.
For the above reasons conservation of cetaceans needs a large scale approach with large areas of sea being designated as protected areas to provide migratory corridors, feeding areas and breeding grounds for the whales. For this same reason many areas which are turning out to be key areas include high seas zones or transboundary zones.

The earlier formulations of the Barcelona Convention in 1982 excluded the high seas from its field of influence. However, the addition to the Convention of 1995 under Article 8, specifically offered states the possibility of ‘’creating SPAMIs situated in whole or in part in the high seas’ (Slim 2001)

As a result, based on the knowledge accumulated to date, ACCOBAMS has identified a number of such key areas of sea around the Mediterranean (Figure 6).

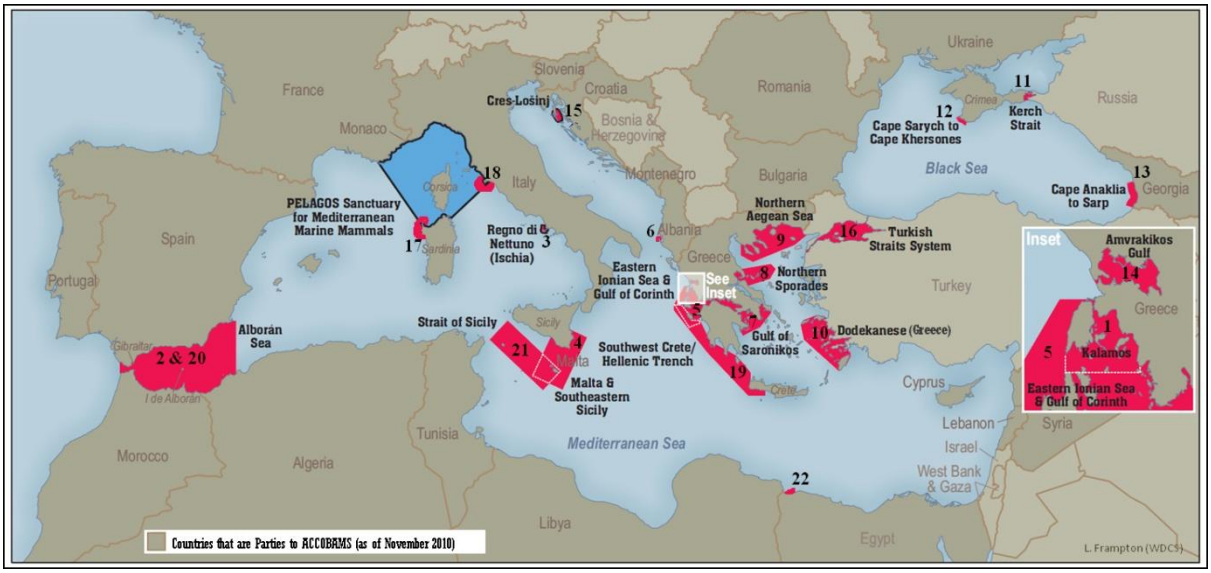



**Figure 6 Regions identified by ACCOBAMS as future areas for protection of cetaceans in the Mediterranean.**

Of these, only the Pelagos Sanctuary is established which is why this remains an important case study.

Of the remaining regions ACCOBAMS has prioritised three:

- The Alboran Sea;
- The Gulf of Lyons canyons;
- the southern Adriatic

For the first attempts at creating the next transboundary protected areas under a project partly funded by the EU. The significance of the Alboran Sea is clearly that it is the bottle neck to all migratory routes to the Atlantic

One concern over the programme in general, however, is that much information still remains to be gathered and if countries were to declare EEZs, particularly those with low research capacity, then this might retard the collection of such data since countries with high capacities can currently collect data unhindered over the high seas..

#### 3.4.1.2.2 Marine Peace Parks

Transboundary protected areas were first developed in terrestrial environments with the clear, explicit objective of conserving biodiversity whilst fostering regional cooperation and security (IUCN, McNeil and Hamilton 1990). The larger zones will give wider protection to species and habitats, particularly for migratory species as seen in the ACCOBAMS reserves discussed above. However this also promote discussion and negotiation between participating states with different approaches in a way that can provide a degree of concord where governance might otherwise be patchy. In addition they can provide a mechanism of staff training and exchange and a more concerted approach to a difficult problem.

This approach is being suggested as a means of dealing with the present mosaic of governance in the Mediterranean against a background which assumes partition of governance and rights across the Mediterranean is increasing and will continue to increase as time goes by yet there is a need for more transboundary areas for conservation (CIESM,[172] Briand 2011). Following the meeting of 30 CIESM scientists at Syracuse in 2010[173] and based on the principles of the Peace Park process the rationale for the creation of 8 large areas for conservation across the Mediterranean were produced (Figure 7).

[172] Marine Peace Park in the Mediterranean – a preview of CIESM Proposal, CIESM, Monaco 2011.
[173] CIESM (2011). CIESM Monograph 41, Monaco


**Figure 7 Eight marine Peace Parks proposed by CIESM (2011)**

Their situation also takes into account the need to create migratory corridors and a linked network rather than just stand alone parks. The three objectives (CIESM 2011) would be:

1. That each area would have coast to coast portions which will help integrate contiguous coastal and open sea habitats and provide the connecting corridors mentioned above. Such a network will also give a more robust address to conservation in relation to climate change;
2. Such parks will also conserve not only the marine biota (unique deep sea communities, coral beds, endemic species, cetaceans and spawning grounds of bluefin tuna amongst others) but also unique geological features such as deep sea canyons and sea mounts and key oceanographic processes from non-sustainable development;
3. The process of negotiation between neighbours will facilitate wider areas of negotiation such as EEZ or seabed claims.

There is thus a human and institutional element in the approach to these parks and they, like the ACCOBAMS approach, with which it shares a number of features, demonstrate the wider realisation that some form a wider, transboundary management is needed in the Mediterranean and that considerable thinking is emerging to this end which also can include the high seas (Coutansais, 2009)[174].

### *3.4.1.3 National MPAs*

MPAs are related in terms of objectives to the Ecologically Protected Zones. In terms of international biological conventions, all of 21 countries bordering the Mediterranean have ratified the Convention on Biological Diversity and the Ramsar Convention. All but Israel and Montenegro have signed the Barcelona Protocol on Special Protected Areas. Although there

[174] Coutansais, C. P. (2009). L'aire marine protégée en haute mare: une nouvelle frontier. Annuaire du Droit du Mare 2009, INDEMER, Monaco: 345 – 360.

are MPAs, they are more frequently associated with coasts and islands and therefore are generally within territorial seas and hence under more direct national governance. Their value is becoming widely recognised and all coastal states within the Mediterranean have established them nationally.

Some protected areas of the Mediterranean have achieved international recognition. For example, there are four UNESCO 'Man and the Biosphere' Reserves amongst those in the Mediterranean and one UNESCO World Geopark. It is relevant to look at the structure and function of these parks, which were initiated after 1968, since they have influenced the structure of MPAs which has consequently affected their legislative status.

Each biosphere reserve is intended to fulfill three basic functions, which are complementary and mutually reinforcing:

- a conservation function - to contribute to the conservation of landscapes, ecosystems, species and genetic variation;
- a development function - to foster economic and human development which is socio-culturally and ecologically sustainable;
- a logistic function - to provide support for research, monitoring, education and information exchange related to local, national and global issues of conservation and development.

These functions are reflected in a zonal structure. Biosphere reserves are organized into 3 interrelated zones:

the central or core area
the buffer zone
the transition or peripheral area

Only the core area requires legal protection and hence can correspond to an existing protected area such as a nature reserve or a national park. This zonation scheme is applied in many different ways in the real world to accommodate geographical conditions, socio-cultural settings, available legal protection measures and local constraints. This flexibility can be used creatively and is one of the strongest points of the biosphere reserve concept, facilitating the integration of protected areas into the wider landscape. The quality of zonation can also be related to the categories designated by IUCN.

In listing the protected areas of the Mediterranean and describing their structures and zonation the following factors have been borne in mind.

A central zone is the heart of the protected area where the legal provisions are strongest. In the case of an integral reserve the level of protection is the strictest even forbidding or restricting access in some cases.

The buffer zone has less stringent legal provisions and, in some ways, often mediates access to the central zone both physically and legally.

A peripheral zone often has no specific laws but has an implication that any population centers in this zone will have a raised awareness and communication to the presence, significance and benefits from the protected area.

A National Park may contain all of these zones and is clearly intended to protect a sizeable area of national conservation significance. A nature reserve has legislation usually not as strong as an integral reserve and the objective tends to be towards the protection of local species or habitats. It may have adapted legislation such as no-take, no-touch regulations

whereas an integral reserve is more likely to be no-take, no-touch, no-do. There may be nature reserves within national parks but they may be managed separately or they may be stand alone.

It is relevant to consider the legislative implications behind such protected areas since if they are expanded as a result of enhanced maritime zones or if transboundary protected areas are to be negotiated, the legal structure will be a factor. As it is, countries around the Mediterranean may use different permutations on the above categories or even some of their own. Nevertheless the outline above which is applied to the MPAs summarized below and illustrated in Figure 9 does give some consistent view of their present status.

***Existing Mediterranean MPAs***

1. **Spain**
   - Catalonia

| **Name** | **Area (ha)** | **Date** | **Status** |
|---|---|---|---|
| Cap Creus | 3073 | 1998 | Regional Nature Park comprising central (integral), buffer (nature reserve) and peripheral (nature park) zones. |
| Iles Medas | 500 | 1990 | MPA including 50ha integral zone. |
| Ses Negres | 42 | 1993 | Marine fish reserve |
| Masia Blanca | 280 | 1999 | Marine reserve |

   - Region of Valencia

| **Name** | **Area (ha)** | **Date** | **Status** |
|---|---|---|---|
| Illes Columbretes | 4,400 | 1990 | Marine reserve with a central maximum protection zone and a buffer zone. |
| Cabo San Antonia | 967 | 1993 and 2002 | Marine nature reserve reinforced 2002 with a central zone of 967ha plus a buffer zone. Now part of the **Natura 2000** network |
| Ile de Tabarca | 1,4603 | 1986 | Marine nature reserve with an integral core and a general reserve |

   - Murcia Region

| **Name** | **Area (ha)** | **Date** | **Details** |
|---|---|---|---|
| Cabo de Palos-ile Hormigas | 1,898 acres | 1995 | Marine reserve with an integral core and a general reserve. |

   - Andalusia

| **Name** | **Area** | **Date** | **Details** |
|---|---|---|---|
| Cabo de Gata Nijar | 4,613 | 1987 | Nature park with central and buffer zones and now a **Biosphere Reserve.** |
| Acantilados de Maro-Cerro Gordo | 1,415 | 1989 | Nature Park with central and buffer zones. |
| El Estrecho | 9,247 | 2003 | Nature Park with central and buffer zones |
| Ile d'Alboran | 26,456 | 2003 | Previously a prohibited military area which became a nature park and marine reserve in 2003 |

| | | | |
|---|---|---|---|
| Iles Chafarinas | | 1982 | National Hunting Refuge within which the Ile Isabella is effectively protected by the army and forbidden to the public. |

- Balearic Islands

| Name | Area | Date | Details |
|---|---|---|---|
| Norte de Menorca | 5,119 | 1999 | Marine reserve with central and buffer zones. |
| Iles Malgrats | 89 | 2004 | Marine reserve |
| Iles del Toro | 136 | 2004 | Marine reserve |
| Bahia de Palma | 2,394 | 1982 | Marine reserve with central and peripheral zones. |
| Migjorn de Mallorca | 22,232 | 2003 | Marine reserve |
| Cabrera Archipelagos | 8,680 | 1991 | National Park with central and peripheral zones |
| Freus d'Evissa | 13,617 | 1999 | Marine reserve with central and peripheral zones |

**2. France**

- Languedoc

| Name | Area | Date | Details |
|---|---|---|---|
| Cerberes Banyuls-sur- Mer | 650 acres | 1974 | Marine nature reserve; includes a 65ha integral area (Rederis) and is a **Natura 2000** site. |

- Bouches-du-Rhone

| Name | Area | Date | Details |
|---|---|---|---|
| Parc regional marin de la cote Bleue | 10,168 | 1983 | Regional Marine Park with a 295ha integral reserve (Carry-le-Rouet) and a 9873ha marine reserve. |
| Parc national terrestro – marin des calanques | | 2010 | The first periurban area at the heart of a National Park in France with an adjoining peripheral zone. |

- Var

| Name | Area | Date | Details |
|---|---|---|---|
| Parc national de Port-Cros/ Parc naturel marin du golfe du Lion. | 650 acres | 1963 | National Park with 650ha terrestrial area and 1800ha marine which, unusually for National Parks in France, has neither a buffer nor peripheral zone. |

- Alpes-Maritimes

| Name | Area | Date | Details |
|---|---|---|---|
| ***Etablissements de peche***: Golfe Juan, Beaulieu, Robquebrune | 50 each | 1980, 1981, & 1983 respectively | These exist specifically as a reserve to protect fish, often in relation to nursery grounds or special habitats. They have a strict no take policy at any time by any method. |

- Corsica

| Name | Area | Date | Details |
|---|---|---|---|
| ***Cantonnements de peche*** | | | Play exactly the same role as the Etablissements de Peche in the Alpes Maritime - as a reserve for fish with a strict no-take policy. This is regarded as particularly significant in Corsica since it is one of the richest areas for biodiversity. |
| Bastia | 790 | 1977 | |
| Florent | 2,440 | 1977 | |
| Ile Rousee | 850 | 1977 | |
| Calvi | 1,074 | 1978 | |
| Porto Piana | 576 | 1978 | |
| Tiuccia-Sagine-Cargese | 1,620 | 1978 | |
| Propriano | 590 | 1978 | |
| Ventilegne | 1,000 | 1977 and 1978 | |
| Bonifacio | 80 | 1983 | |
| Porto Vecchio | 1,000 | 1978 | |
| | | | |
| ***Reserves*** | | | |
| Scandola | 2,000 | 1975 | Nature reserve with 919ha of land and 1000ha of sea and a further reserve of 78ha with reinforced protection between the Ile de Gargalu and Punta Palazu. |
| Iles Lavezzi | 5,000 | 1982 | Nature reserve with both land and sea components |
| Bouches de Bonifacio | 80,000 | 1999 | Nature Reserve with integral status across the central zone and a peripheral zone. *A project exists to create a transboundary park which will include the Iles Lavezzi, Les Bouches de Bonifacio and the Italian archipelago of Maddalena (see below).* |

### 3. Principality of Monaco

| Name | Area | Date | Details |
|---|---|---|---|
| Larvotto | 50 | 1978 | MPA |
| Aire de protection du corail | 1 | 1986 | Protected area specifically for the regeneration of corals. |

### 4. Italy

- Liguria

| Name | Area | Date | Details |
|---|---|---|---|
| Promontoire de Portofino | 346 | 1998-1999 | Marine nature reserve with central, buffer and peripheral zones which have become the marine |

| | | | |
|---|---|---|---|
| | | | component of a terrestrial National Park created in 1982. |
| Cinque Terre | 4,590 | 1997 | MPA with central, buffer and peripheral zones. |

- Tuscany

| Name | Area | Date | Details |
|---|---|---|---|
| Ile de Gorgona | 1.5km$^2$ | 1986 | Protected since the end of the 19$^{th}$ century by the existence of a penitentiary and therefore prohibited to the public. The island was proposed in 1986 as a biogenetic reserve. |
| Archipel Toscan | 61,475 | 1989 | National Park and declared a **Biosphere Reserve** in 2003. The park includes the sea bed around Elba, which was recognised in 1971 as a zone of biological protection, along with the ile di Pianosa, long protected by its penitentiary, and the reserve of the island of Montecristo created in 1977 and including 800 ha of sea, together recognised as a biogenetic reserve and awarded the diploma of the Council of Europe in 1988. |

- Sicily

| Name | Area | Date | Details |
|---|---|---|---|
| Ile Ciclopi | 623 | 1989 | MPA with an integral reserve, a general reserve and peripheral zone. |
| Capo Gallo | 2,173 | 2002 | MPA comprising an integral and general reserve with a peripheral zone. |
| Ile Egadi | 53,990 | 1993 | MPA with central, buffer and peripheral zones. |
| Ile d'Ustica | 15.960 | 1986 | MPA with central, buffer and peripheral zones |
| Ile Pelagia | 4,368 | 2002 | MPA comprising central, buffer and peripheral zones. |

- Sardinia

| Name | Area | Date | Details |
|---|---|---|---|
| Archipel di la Maddalena | 15,146 | 1996 | National Park and part of the network of World Geoparks of **UNESCO** with central, buffer and peripheral zones. |
| Ile di Tavalora | 15,357 | 1997 modified 2001 | MPA with central, buffer and peripheral zones. |
| Capo Carbonara | 8,598 | 1998,1999 | MPA with integral and general reserves and a peripheral zone. |
| Penisola del Sinis | 24,800 | 1997,1999 | MPA comprising central, buffer and peripheral areas. |
| Caop Caccia et ile Piana | 2,630 | 2002 | MPA with an integral reserve, buffer and peripheral zones. |
| Asinara | 10,732 | 1997 | National Park and MPA comprising an integral reserve with buffer and peripheral zones. |
| Golfe d'Orosei | 2 km | 1987 | Protected by a decree of 1987 for up to 2km from the coast. The possibility of making it a reserve is being studied. |

- Lazio

| Name | Area | Date | Details |
|---|---|---|---|
| Secche di Tor Paterno | 1,200 | 2000 | MPA which is a pelagic reserve 6 miles from the coast. |

- Campania

| Name | Area | Date | Details |
|---|---|---|---|
| Castellabate | 4,400 | 1972 | Biological protection zone |
| Iles Ventolene et Santo Stefano | 2,800 | 1997 | MPA comprising integral and general reserves and a peripheral zone with, in 1999, the surrounding terrestrial area. |
| Punta Campanell | 1,539 | 1997-2000 | MPA with integral and general reserves and a peripheral zone |

- Calabria

| Name | Area | Date | Details |
|---|---|---|---|
| Capo Rizzuto | 13,500 | 2002 | MPA |

- Puglia

| Name | Area | Date | Details |
|---|---|---|---|
| Porto Cesareo | 17,156 | 1997 | MPA |
| Torre Guaceto | 2,227 | 1991 | MPA with central, buffer and peripheral zones. |
| Ile Tremiti | 1,466 | 1989 | MPA attached to the terrestrial National Park of Gargano |

- Friuli Venezia Giulia

| Name | Area | Date | Details |
|---|---|---|---|
| Miramare | 120 | 1986 | MPA created a **Biosphere Reserve** in 1979 and has a central and buffer zone |

### 5. Slovenia

| Name | Area | Date | Details |
|---|---|---|---|
| Debeli Rtic | 16 | 1991 | Natural monument |
| Strugan | 90 | 2004 | Nature reserve with central and buffer zones |
| Cape Madona | 13 | 1990 | Natural monument |

### 6. Croatia

| Name | Area | Date | Details |
|---|---|---|---|
| Limski Zaljev | 600 | 1979 | Special marine reserve |
| Iles Brijumi | 2,651 | 1983 | National Park with central and buffer zones. |
| Strunjan | 7 | 1977 | Integral reserve |

| | | | |
|---|---|---|---|
| Telascica | 3,972 | 1988 | Nature park |
| Kornati | 16,750 | 1980 | National Park with 140 islands over a central and buffer zone. |
| Malostonski Zaljev | 4,820 | 1983 | Special marine reserve comprising central and buffer zones |
| Mljet | 2.2 $Km^2$ | 1960, 1996 | National Park with 145 ha under reinforced protection a further 2375ha and a buffer zone which includes two basins communicating with the open sea (the Great Lake of 1.45 $Km^2$ and the Small Lake at 0.42$km^2$) |
| Lokrum | 72 | | Nature reserve |

### 7. Greece

| Name | Area | Date | Details |
|---|---|---|---|
| Kefallina (Ionian Islands) | Straights between Ithaca and Cephalonia | 1986 | Protection zone consisting of the straights between Ithaca and Cephalonia, a band of sea 500m wide and a section of shore up to 100m from the tide line |
| Zakynthos | 8,920 | 2003 | National Marine Park |
| Alonissos-Vories Sporades | 226,500 | 1992 | National Marine Park with central, buffer and peripheral zones. |

### 8. Turkey

| Name | Area | Date | Details |
|---|---|---|---|
| Dilek Yarimadasi | 12,200 | 1966 | National Park with 11,000ha terrestrial and 1200ha marine elements. |
| Datca-Bozburun | 76,300 | 1990 | Special protected area |
| Kekova | 11,500 | 1990 | Special protected area with both natural and archaeological protection within a central and buffer zone |
| Olympus | 46,500 | 1972 | National Park in Antalya with 750ha of sea and the rest being land |

### 9. Cyprus

| Name | Area | Date | Details |
|---|---|---|---|
| Lara Toxeftra | 650 | 1978 | Marine reserve and biological reserve with 550ha being marine and the remainder land. |

### 10. Syria

| Name | Area | Date | Details |
|---|---|---|---|
| Ras El Bassit | 3,000 | 1999 | Protected area with central and peripheral zones |
| Om Al Toyour | 1,000 | 1999 | Protected area with central and buffer zones |
| Fanar Ibn Hani | 1,000 | 2000 | Protected area with central and buffer zones |

### 11. Lebanon

| Name | Area | Date | Details |
|---|---|---|---|
| Palm Island | 420 acres | 1992 | Nature reserve |

### 12. Israel

| Name | Areas | Date | Details |
|---|---|---|---|
| Yam Dor Habonin | 530 | 2002 | Marine nature reserve with central, buffer and peripheral zones |
| Yam Evtah | 137 | 2003 | Marine nature reserve with central, buffer and peripheral zones. |
| Yam Gador | 85 | 2003 | Marine nature reserve with central, buffer and peripheral zones |

### 13. Egypt

| Name | Areas | Date | Details |
|---|---|---|---|
| Lac d'Edku | $10km^2$ | | A populated zone near Alexandria incorporating a saline coastal lake, its shore and its opening to the sea |
| Ras El Mekuma | $25km^2$ | | Protected zone covering a large area of sea near Matru down to the 50m isobath |

### 14. Tunisia

| Name | Areas | Date | Details |
|---|---|---|---|
| Iles Zembra et Zembretta | 4,700 | 1977 | National Park and **Biosphere Reserve** covering the terrestrial area of two islands and the surrounding sea. Has a central and buffer zone, a transitional area of sustainable development |
| Archipel de La Galite | 450 | 1980, 2002 | Nature reserve. |

### 15. Algeria

| Name | Areas | Date | Details |
|---|---|---|---|
| Iles Habibas | 2,740 | 2003 | Marine nature reserve of 2700ha of sea and 40ha of land with central, buffer and peripheral zones. |

### 16. Morocco

| Name | Area | Date | Details |
|---|---|---|---|
| Al Hoceima | 16,900 acres | 2004 | National Park with central, buffer and peripheral zones. |

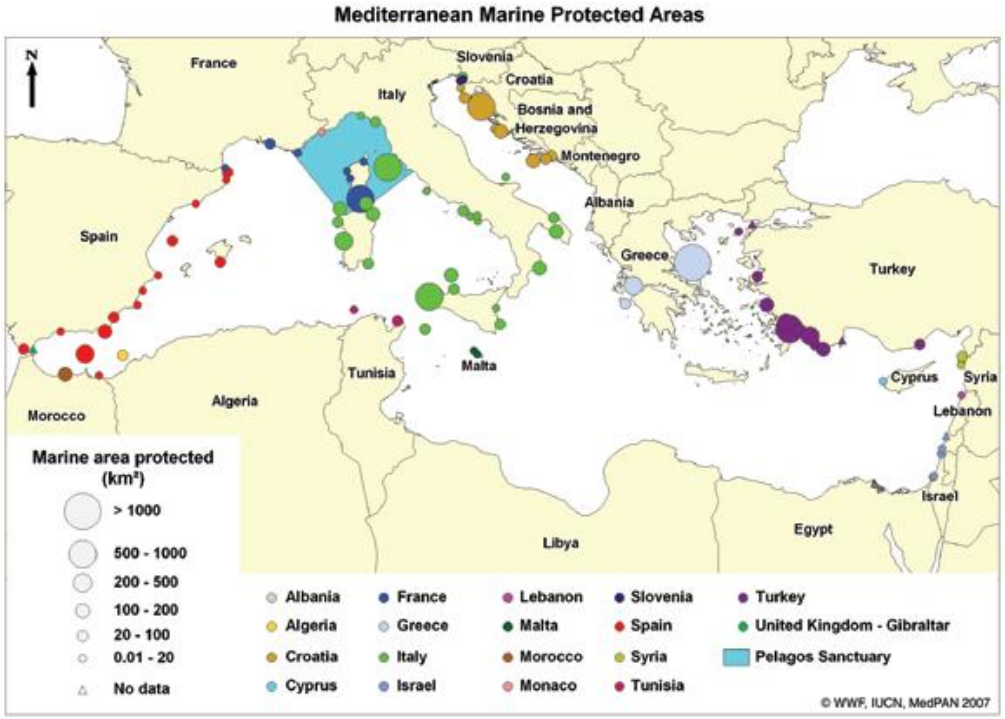



**Figure 8 Distribution of Mediterranean MPAs. Different colours represent different countries. Source: Abdulla et al., 2008**

All told, there are 94 national protected areas including two Natura 2000 sites, one UNESCO Geopark and four Man and the Biosphere sites. They extend over 1,246,283km which if added to international conservation area of the Pelagos Sanctuary, increases to 2,121,283 ha. The MPAs therefore cover almost 1% of the total surface of the Mediterranean or 5% of the oceanographic continental shelf. This is significant but needs to be set against the targets defined by the Convention of Biological Diversity at its recent meeting in Nagoya (October 2010) which put the target at 10% by 2020.

Generally MPAs are more well defined both physically and jurisdictionally then EPZs. There is no reason why they should be limited to the coast or territorial waters, as the Pelagos Sanctuary demonstrates, but they could be limited by lack of full EEZ powers

| **BOX 1. Mediterranean SPAMIs (UNDP 2009)** | |
|---|---|
| **Algeria** | 1. Banc des Kabyles Marine Reserve / Réserve Marine du Banc des Kabyles<br>2. Habibas Islands / Les îles Habibas |
| **France** | 3. Port-Cros National Park / Parc National de Port-Cros<br>4. Natural Reserve of Bouches de Bonifacio / Réserve Naturelle des Bouches de Bonifacio |
| **Italy** | 5. MPA of Portofino / Aire Marine Protégée de Portofino<br>6. Miramare MPA / Aire Marine Protégée de Miramare<br>7. Plemmirio Protected Area / Aire Protégée de Plemmirio<br>8. Tavolara-Punta Coda Cavallo MPA / Aire Marine Protégée Tavolara-Punta Coda Cavallo<br>9. MPA and Natural Reserve of Torre Guaceto / Aire Marine Protégée et Réserve Naturelle de Torre Guaceto<br>10. MPA Capo Caccia-Isola Piana / Aire Marine Protégée de Capo Caccia-Isola Piana |

| | |
|---|---|
| | 11. MPA Punta Campanella / Aire Marine Protégée de Punta Campanella |
| **Morocco** | 12. Al-Hoceima National Park / Parc National d'Al-Hoceima |
| **Spain** | 13. Alboran Island / Ile d'Alboran<br>14. Natural Park of Cabo de Gata-Nijar / Parc Naturel de Cabo de Gata-Nijar<br>15. Sea Bottom of the Levante of Almeria / Le fond marin du Levant d'Almérie<br>16. Maro-Cerro Gordo Cliffs / Les falaises de Maro-Cerro Gordo<br>17. Natural Park of Cap de Creus / Le Parc Naturel de Cap de Creus<br>18. Medes Islands / Les Iles Medes<br>19. Mar Menor and Oriental Mediterranean zone of the Region of Murcia coast / Mar Menor et la côte méditerranéenne orientale de la région de Murcie<br>20. Columbretes Islands / Iles Columbretes<br>21. Archipelago of Cabrera National Park / Parc National de l'archipel de Cabrera |
| **Tunisia** | 22. La Galite Archipelago / Archipel de la Galite<br>23. Kneiss Islands / Les îles Kneiss<br>24. Zembra and Zembretta National Park / Parc National de Zembra et Zembretta |
| **France, Italy and Monaco** | 25. Pelagos Sanctuary for the Conservation of Marine Mammals |

There are some MPAs, such as the *Etablissement du Peche* in the *Alpes Maritime* department of France (see above) which are entirely in the open sea and have an appropriate means of control (see below).

There is another layer of support for such protected areas for those designated as Special Protected Marine Areas of Mediterranean Interest (SPAMI[175]) under the Barcelona Convention. A list of these is given in Box 1 of which many, but not all, also appear in the national lists above and vice versa.

### 3.4.2 Fisheries Restricted Areas under GFCM

In 2005 the GFCM agreed to prohibit all fishing in the Mediterranean deeper than 1000m (Recommendation GFCM/2005/1 on the management of certain fisheries exploiting demersal and deepwater species). Some of the areas most deserving of demersal protection are not completely covered by this resolution, so in 2006 GFCM recommended the establishment of three areas where fishing with towed dredges and bottom trawls is prohibited (recommendation 30/2006/3). The "Lophelia reef off Capo Santa Maria di Leuca", "the Nile delta area cold hydrocarbon seeps" and "the Eratosthemes Seamount".

[175] Fabio Spadi (1997), "Il Protocollo relativo alle aree specialmente protette e alla diversità biologica nel Mediterraneo (Barcellona, 10 giugno 1995) - Analisi e confronto con il Protocollo relativo alle aree del Mediterraneo particolarmente protette (Ginevra, 3 aprile 1982)", *Il Diritto Marittimo*, pp. 1196 ff. (in Italian).

The preamble to this resolution mentions key reasons for implementing the ban as being that the Scientific Advisory Committee recommended a ban on bottom trawling activity in the deep water coral reefs and other sensitive deepwater habitats located in international waters including the cold hydrocarbon seeps in the Nile Delta, which favour the development of a unique living community. Note, however, that fishing with longlines and pots would still be allowed in these areas.

The GFCM has established a procedure for the nomination of Fisheries Restricted Areas. The only area to be so designated to date is the Gulf of Lions restricted area, which was nominated by a collaboration of ICM/CSIC Barcelona, IEO, Balears, IFREMER, Sète, Fac. Economia, University of Barcelona and WWF in September 2008. The area was designated officially by RECOMMENDATION GFCM/33/2009/1. The proposal had recognised the existing problems with the designation of the Spanish Fisheries Protection Zone (i.e. non-recognition by France) but pointed out that the area did not overlap with this “dispute”, being whole contained within the French ecological protection zone

The reasons for protection were cited as critical spawning areas, and the threat as use by French and Spanish trawlers, and the proposal requested the prohibition of any kind of demersal fishing, towed or not, including trawl gears, bottom and midwater longlines, bottom nets (gillnets, trammel nets), traps, etc (noting that some of the area was deeper than 1000m, but that as described above the deep water fishing prohibition under Recommendation GFCM/2005/1, only prohibits the use of towed dredges and trawling, not long-lining, gill-netting or any other system able to catch fish spawners. In the event the final decision only required a limitation on effort (of all gears) at 2008 levels.

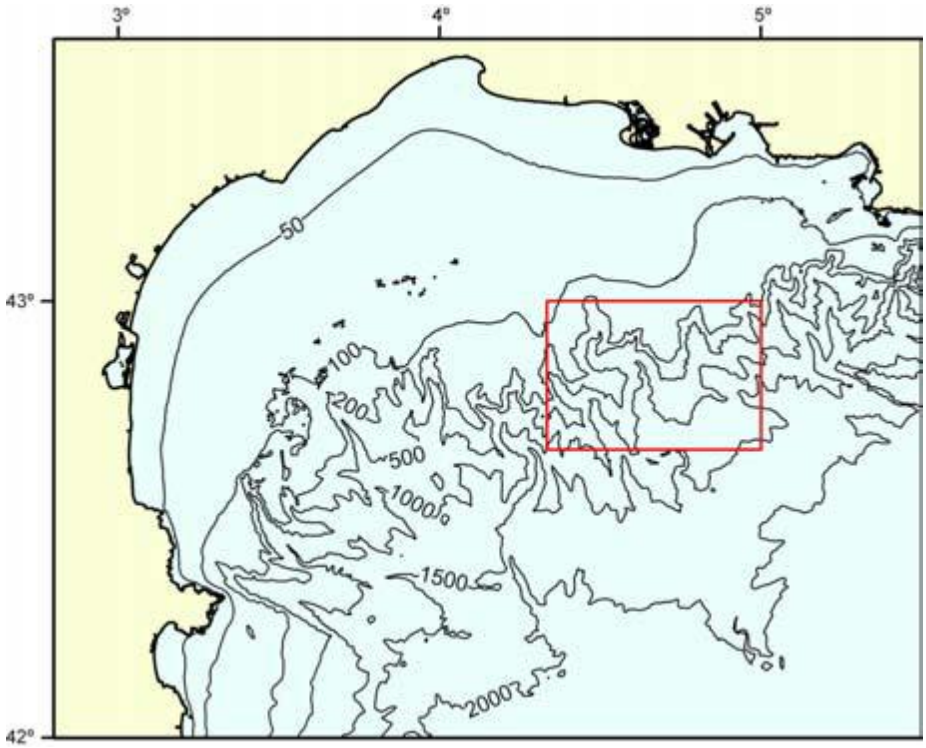



**Figure 9 Proposed GFCM protection zone**

To date no other Fisheries Restricted Areas have been designated, though in November 2010 Oceana proposed one for the Balearic Islands.

### 3.4.3 Fisheries protected areas under the Mediterranean Fisheries Regulation

The Mediterranean Fisheries Regulation[176] incorporates the environmental dimension into fisheries management and promotes, inter alia, the establishment of "fishing protected areas" (FPAs) in which all or certain fishing activities may be temporarily or permanently banned or restricted in order to improve the exploitation of living aquatic resources (protection of nursery areas or spawning grounds) or the protection of marine ecosystems. These areas may be established either at national (within MS territorial waters) or at EU level for areas essentially beyond the territorial seas. The definition of "fishing protected areas" fully matches the definition of "fisheries restricted areas" under the GFCM. No fishing protected areas, new with respect to what was already implemented before 2007, have been established for the protection of nursery or spawning areas. Nonetheless, the goal to protect the marine ecosystem makes the establishment of FPAs converging towards the more general goal of establishing "marine protected areas". In this respect, complementarities and synergies among the Habitats Directive, in particular its Natura 2000 network of protected areas in the marine environment, and the provisions on the fishing protected areas in territorial waters as stipulated by the Mediterranean Regulation are under examination.

### 3.4.4 Maritime areas established under the auspices of IMO

A number of different types of maritime area have been established under the auspices of IMO.

### 3.4.5 Special Area

First of all the entire Mediterranean Sea is a ‘Special Area’ within the meaning of Annexes I and II of MARPOL 73/78. Such special areas are defined by MARPOL 73/78 as sea areas which for technical reasons relating to their oceanographical and ecological condition and to their sea traffic require the adoption of special mandatory methods for the prevention of sea pollution is required. The relevant decision was adopted within IMO on 2 November 1973 and entered into force some ten years later on 2 October 1983.

### 3.4.6 PSSA

A number of PSSAs have been declared to date in European waters including one in the Mediterranean. This is the PSSA of the Strait of Bonifacio which was designated by the IMO’s Marine Environment Protection Committee (MEPC) during its 62nd session held between 11 and 15 July 2011.

The establishment of a second proposed PSSA, which would relate to the Adriatic Sea, is less advanced as a number of technical issues remain to be resolved. The proposal, however, has the general support of the Adriatic States.

### 3.4.7 SAR regions

As described in Section 2.6.3, SAR regions established pursuant to the SAR Convention are established solely for the purpose of coordinating maritime SAR activities from a rescue coordination centre.

The situation as regards SAR regions in the Mediterranean is currently somewhat complex with several boundaries undelineated/unagreed and with a number of overlapping SAR regions such as the case of Italy and Malta.

[176] Council Regulation (EC) No 1967/2006 of 21 December 2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea, amending Regulation (EEC) No 2847/93 and repealing Regulation (EC) No 1626/94 OJ L 409 30.12.2006, p 11.

Tensions have recently risen over SAR responsibilities as a result of illegal migration activities in connection with recent amendments to SOLAS and the SAR Convention. These amendments impose a duty on the State in whose SAR region a rescue operation takes place to secure a place of safety for rescued persons. Malta has yet to ratify these amendments and has on several occasions rejected the existence of such an obligation.[177]

[177] See Trevisnaut, S. *op cit* at page 525.

# 4 The potential impacts of establishing EEZs and/or derivative zones in the Mediterranean Sea

While section two of this report contained a general description of the legal impacts of maritime zones under international law, the aim of this chapter is to identify the main potential legal impacts of establishing EEZs and/or derivative zones in the Mediterranean Sea. In terms of analysing such impacts it is necessary to consider not only the position under international law but also, as far as EU Member States, candidate and potential candidate countries are concerned, the implication of EU policies. In the analysis that follows the term EU policies should be understood to include not only the Treaties of the EU as well as the legislation (in the form of directives, regulations and decisions) adopted on the basis of the Treaties but also the international agreements to which the EU is party and which form part of the *acquis communautaire*. In the Mediterranean context such agreements include the Barcelona Convention, the GFCM Agreement and the ICCAT Convention.

Mention can also be made of the Union for the Mediterranean (UfM), which was launched in 2008, provides the broad political framework for regional cooperation in the Mediterranean Basin. The UfM, which comprises the 27 EU Member States, the Mediterranean coastal States as well as Jordan and Mauritania, both replaced and re-launched the 'Barcelona Process' which was guided by the agreements of the Barcelona Declaration178, and which formed the basis of the Euro-Mediterranean Partnership. Key initiatives of the UfM that are potentially relevant to the issue of maritime zones include:

- the de-pollution of the Mediterranean Sea, including coastal and protected marine areas;
- the establishment of maritime and land highways that connect ports and improve rail connections so as to facilitate movement of people and goods;
- a joint civil protection programme on prevention, preparation and response to natural and man-made disasters.[179]

## 4.1 The Integrated Maritime Policy

On 10 October 2007 the European Commission adopted a Communication[180] setting out its vision for an Integrated Maritime Policy (IMP) for the EU, together with a detailed action plan[181] setting out a work programme for the years ahead.

This vision was welcomed by the European Council on 14 December 2007 and the Commission was invited to come forward with the initiatives and proposals contained in the action plan. In accordance with the implementation of the action plan a series of subsequent Communications and reports have subsequently been adopted by the Commission including a:

- Communication from the Commission - Roadmap for Maritime Spatial Planning: Achieving Common Principles in the EU (the 'Roadmap for MSP Communication');[182]
- Communication from the Commission to the European Parliament and the Council - the European Union and the Arctic Region (the 'Arctic Communication');[183]

[178] Barcelona Declaration, adopted at the Euro-Mediterranean Conference - 27-28/11/95
[179] http://eeas.europa.eu/euromed/index_en.htm
[180] COM (2007) 575, 10.10.2007, p. 6.
[181] SEC (2007) 1278, 10.10.2007, p. 8.
[182] COM(2008) 791 final, Brussels, 25.11.2008.
[183] COM(2008) 763 final, Brussels, 20.11.2008.

- Communication from the Commission to the Council and the European Parliament - Towards an Integrated Maritime Policy for better governance in the Mediterranean (the 'Mediterranean IMP Communication');[184]
- Communication from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Towards the integration of maritime surveillance: A common information sharing environment for the EU maritime domain (the 'Maritime Surveillance Communication);[185]
- Report from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Progress Report on the EU's Integrated Maritime Policy (the 'IMP Progress Report');[186]
- Communication from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions Developing the international dimension of the Integrated Maritime Policy of the European Union (the 'International dimension Communication');[187]
- Communication from the Commission to the Council and the European Parliament on a Draft Roadmap towards establishing the Common Information Sharing Environment for the surveillance of the EU maritime domain (the 'Roadmap for maritime data sharing');[188]
- Communication from the Commission to the Council and the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Maritime Spatial Planning in the EU, Achievements and Future Development (MSP – Achievements & Developments Communication).[189]

Some of these communications, such as the Arctic Communication, have little obvious relevance to the issue of maritime zones in the Mediterranean. Others, in particular the Mediterranean IMP Communication, which was referred to in the introduction to this report, as well those relating to maritime spatial planning (MSP), clearly do and which is considered in more detail below.

The Mediterranean IMP Communication is obviously directly relevant to the present Study (and indeed the Study is a direct outcome of the communication). The communication notes that unlike other European semi-enclosed seas, such as the Baltic Sea and the Black Sea, 'a large part of the Mediterranean remains High Seas, thereby raising specific governance issues'. This large proportion of marine space made up of high seas 'makes it difficult for coastal States to plan, organise, and regulate activities that directly affect their territorial seas and coasts'.

Beyond the communications that derive directly from the IMP a large number of other instruments, some of which pre-date the start of the IMP process, may also be directly or indirectly relevant to the issue of maritime zones in the Mediterranean.

## 4.2 Safety of navigation and vessel source pollution

Linking, as it does, both the Suez Canal and the Black Sea to the Atlantic Ocean the Mediterranean has been an important shipping route, a 'sea of transit', since ancient times. Coupled with the fact that the EU States with the largest merchants fleets, in terms of

[184] COM(2009) 466 final, Brussels, 11.9.2009.
[185] COM(2009)538 final, Brussels, 15.10.2009.
[186] COM(2009)540 final, Brussels, 15.10.2009.
[187] COM(2009)536 final, Brussels, 15.10.2009.
[188] COM(2010) 584 final, Brussels, 20.10.2010.
[189] COM(2010) 771, Brussels, 17 December 2010.

tonnage, are Mediterranean countries (Greece, Cyprus and Malta) ensuring freedom of navigation has long been a key objective. But what would the impacts of the establishment of EEZs in the Mediterranean actually be in terms of navigation relating to both safety and vessel source pollution?

First of all, as described section 2.6.1, in terms of normative, or rule-making, jurisdiction, it is clear that, while the coastal Mediterranean States would be entitled to adopt specific laws and regulations relating to vessel-source pollution within their respective EEZs (or relevant derivative zones), the actual content of such laws could not go beyond GAIRAS or generally accepted international rules and standards except by complying with Article 211(6) of UNCLOS, which it will be recalled provides that more stringent standards can be adopted for special areas subject to IMO approval.

In other words the Mediterranean coastal States could not unilaterally adopt legislation to introduce new standards or rules relating to vessel sources pollution that are stricter than those adopted through or approved by IMO (through for example the establishment of a PSSA).

In terms of specific local-level navigational rules relating to platforms and fixed structures, a coastal State can make rules within its EEZ (or relevant derivative zone). However, as these provisions are basically the same as those relating to the continental shelf, the establishment of an EEZ or derivative zone would have no substantive impact.

Nor would the establishment of an EEZ or derivative zone make a substantive difference as regards the establishment of PSSAs although in practice if a coastal State has not claimed an EEZ or relevant derivative zone it may make it more difficult in terms of generating the necessary support within IMO for the creation of a PSSA in an area beyond national jurisdiction.

It is, however, as regards enforcement that the establishment of an EEZ or a derivative zone, such as an EPZ has the greatest potential impact as far as reducing vessel source pollution. As described in section 2.6.1.3 above, article 220 of UNCLOS confers enforcement powers upon coastal States, in particular circumstances, in respect of non-compliance with applicable international rules and standards. In this connection it is also important to mention Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements[190] (the 'Ship Source Pollution Directive') which incorporate international standards for ship-source pollution relating principally to MARPOL 73/78 into EU law and to ensure that persons responsible for discharges are subject to adequate penalties.

In giving effect to the EU's maritime safety policy, which aims at a high level of safety and environmental protection, the Directive applies *inter alia* to the EEZ or derivative zone of a Member State, established in accordance with international law. Such impacts may be significant. The French EPZ provides a clear example in this connection as discussed in more detail in Section 7 below.

The monitoring of discharges is undertaken by the European Maritime Safety Agency (EMSA) through the CleanSeaNet programme.

In terms of EU policies the establishment of EEZs or derivative zones by EU Member States would not appear to have any major impacts except to the extent that it would expand the potential scope of application of the Ship Source Pollution Directive and thus further reinforce the enforcement of MARPOL 73/78 in the Mediterranean.

[190] OJ L 255, 30.9.2005, p. 11.

## 4.3 Fisheries and mariculture

### 4.3.1 The Common Fisheries Policy

The establishment of EEZs (or relevant derivative zones such as EFZs) in the Mediterranean would have significant impacts on fisheries and mariculture in terms of both regulating access to fisheries as well as enforcement.

More specifically existing sea areas would be removed from the high seas regime which, with the exception of certain tuna stocks, is basically one of open access, and placed under the normative and enforcement jurisdiction of coastal States. As a result a relevant coastal State could exclude unauthorised vessels from fishing there (as they already can for sedentary species – those which at the harvestable stage of their life cycle are unable to move except in constant physical contact with the seabed or subsoil – which by Article 68 of UNCLOS come under the continental shelf regime).

As regards EU coastal States, however, the impacts in terms of access would be mitigated and modified by the EU Common Fisheries Policy (CFP). Unlike the IMP, the CFP has a formal Treaty legal basis. The scope of the CFP is rather broad (addressing, as it does, conservation, the environmental impact of fishing, fishing fleet and structural policy, access to waters and resources, control and enforcement, aquaculture, market policy and international fisheries).

Apart from the CFP Regulation[191], which is currently subject to review, and the Mediterranean Fisheries Regulation which as it name implies sets out a specific set of rules for Mediterranean fisheries, the legal framework for the CFP comprises a large body of legislation in addition to the Mediterranean Fisheries Regulation much of which may be directly or indirectly relevant to the Mediterranean (including the Control Regulation[192] and its implementing regulation[193]).

A full discussion of the CFP and the legal framework for its implementation is beyond the scope of this report. Nevertheless it is clear that the introduction of maritime zones in the Mediterranean has potentially important implications as regards the scope and manner of implementation of the CFP, particularly as far as monitoring, control and surveillance is concerned.

The starting point is to note that the CFP already applies within the Mediterranean. In terms of its spatial scope, the CFP applies to 'Community waters' which are defined in Article 3 (a) of the current CFP Regulation[194] to mean 'the waters under the sovereignty or jurisdiction of the Member States with the exception of waters adjacent to the territories mentioned in

[191] Council Regulation (EC) No 2371/2002 of 20 December 2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy OJ L 240, 10.7.2004, p. 17.
[192] Council Regulation (EC) No 1224/2009 of 20 November 2009 establishing a Community control system for ensuring compliance with the rules of the common fisheries policy, amending Regulations (EC) No 847/96, (EC) No 2371/2002, (EC) No 811/2004, (EC) No 768/2005, (EC) No 2115/2005, (EC) No 2166/2005, (EC) No 388/2006, (EC) No 509/2007, (EC) No 676/2007, (EC) No 1098/2007, (EC) No 1300/2008, (EC) No 1342/2008 and repealing Regulations (EEC) No 2847/93, (EC) No 1627/94 and (EC) No 1966/2006, OJ L 343, 22.12.2009, p 1.
[193] Commission Implementing Regulation (EU) No 404/2011 of 8 April 2011 laying down detailed rules for the implementation of Council Regulation (EC) No 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy OJ L 112, 30.4.2011, p. 1.
[194] The CFP Regulation is currently being reformed.

Annex II to the Treaty' (which are basically the non-European territories of various Member States). Moreover the Mediterranean Fisheries Regulation explicitly recognises the applicability of the CFP Regulation to the Mediterranean Sea.

However, while the Mediterranean Fisheries Regulation is expressed to apply to the conservation, management and exploitation of living aquatic resources in the Mediterranean Sea (which it defines), in terms of the purely spatial scope of its application this is limited to the maritime waters falling under the sovereignty or jurisdiction of Member States. While the regulation is also expressed to apply to Community fishing vessels in the waters of the Mediterranean that lie beyond the sovereignty or jurisdiction of the Member States, as well as to EU nationals throughout the Mediterranean sea and the marketing of fishery products caught there, the net result is that the 'Community Control and Enforcement System' foreseen in Chapter IV of the CFP Regulation applies to EU-flagged vessels throughout the Mediterranean but otherwise only as regards the respective territorial seas of the Member States and to their EEZs or fishing zones if these have been claimed. In practical terms this implies something of a 'gap' as regards monitoring, control and surveillance (MCS) over those parts of the Mediterranean that remain part of the high seas and which are not subject to MCS activities pursuant to the ICCAT Convention.

In terms of access, the establishment of EEZs or fishery zones by EU Member States is essentially neutral as regards other EU registered fishing vessels. The basic principle as regards access is set out in Article 17 (1) of the CFP regulation which states: 'Community fishing vessels shall have equal access to waters and resources in all Community waters other than those referred to in paragraph 2, subject to the measures adopted under Chapter II'.

The paragraph 2 referred to, (Article 17(2)), relates to the rights of coastal Member States to restrict fishing within their territorial seas to vessels that have traditionally fished those waters and is thus not relevant here. Chapter II relates to Community measures adopted by the Council governing access to waters and resources and the sustainable pursuit of fishing activities.

Moreover Article 18 provides for the allocation of fishing opportunities (catch/effort limits) among Member States such as catch quotas. But if, as is currently the case, there are no quotas for Mediterranean stocks (other than for blue-tuna adopted to give effect to the EU's rights and duties under ICCAT) fishing vessels registered in EU Member State A may fish within the EEZ or fishing zone of EU Member State B, subject only to any conservation measures adopted pursuant to Chapter II of the CFP Regulation (or in fact the Mediterranean Fisheries Regulation).

Given that the establishment of EEZs or relevant derivative zones by EU Member States in the Mediterranean would effectively be neutral as regards EU flagged vessels the main losers in terms of access to fisheries would be those non-EU coastal States that currently fish in the waters that would be included within such zones.

What of the argument that the establishment of EEZs or relevant derivative zones might encourage other non EU coastal States to retaliate by claiming equivalent zones of their own? There is some truth in this concern except to note that, as observed in section three, most of the non-EU coastal States have actually claimed or taken steps to claim an EEZ or (in the case of Algeria) a fishing zone.

While EU Member States that declare an EEZ or relevant derivative zone would not be entitled to unilaterally regulate the fisheries contained therein (this would remain a competence of the EU under the CFP) it seems likely that enforcement, which is a Member State responsibility, would in legal terms be significantly strengthened, as a coastal State

would have full monitoring and enforcement powers against all vessels within its EEZ (or derivative zone) in contrast to the situation whereby monitoring and enforcement takes place on the high seas by the flag State.

### 4.3.2 The ICCAT Convention

In terms of the international fisheries agreements to which the EU is party, given that the ICCAT Convention is subject to the rules of international law relating to jurisdiction over fisheries, as regards the effects of the establishment of EEZs or relevant derivative zones in the Mediterranean the principal impact would be on access to coastal State waters (specifically the coastal State EEZ or derivative zone) rather than on the amount of fish that could be caught, given the existence of the ICCAT TAC and quota regime described previously. In other words EU vessels would be entitled to access Community waters, within the meaning of the CFP Regulation, although fishing activity would remain subject to any quotas issued through ICCAT for relevant species.[195]

Non-EU vessels would, in the absence of agreement, be excluded from fishing in EU waters even if they have access to a relevant quota. For example non-EU vessels do not have access to the Spanish EFZ to fish for tuna species even if they hold an ICCAT quota. Equally, though, EU vessels are not able to fish for relevant tuna species, even if they hold quota, in the EEZs or derivative zones of other Mediterranean coastal States unless some form of access agreement is in place with such States.

In terms of the enforcement of the ICCAT fisheries regime is concerned, as primary responsibility for monitoring, control and surveillance would, following the establishment of an EEZs or derivative zone, lie with the coastal State in respect of such zone rather than, as at present, being based through collaborative flag State enforcement on the high seas. In such circumstances, having identified that an infraction has taken place a coastal State will be entitled to arrest a vessel and take direct enforcement action rather than relying on the flag State.

Pursuant to Article XIV of the ICCAT Convention, on the basis of scientific evidence ICCAT may, moreover, make binding recommendations designed to maintain the populations of tuna fisheries to as to permit the maximum sustainable catch. Such recommendations, which may be made at the initiative of ICCAT or Panels established on the basis of species, groups of species or geographic areas, are essentially binding upon parties to the ICCAT Convention unless they lodge a formal objection within six months of the date of notification. In outline if objections are made by a majority of the parties then a recommendation does not become effective. If objections are made to a recommendation by more than one fourth of the contracting parties but less than the majority, such a recommendation is only effective against those parties that have not presented an objection. If, however, objections are made by less than one fourth of the contracting parties recommendations are effective even against those objecting parties.

By Article IX the contracting parties agree to take all action necessary to ensure the enforcement of the ICCAT Convention and to collaborate to set up an effective system of international enforcement to be applied to the Convention area ‘except the territorial sea and other waters, if any, in which a state is entitled under international law to exercise jurisdiction over fisheries’ (article IX (3)). In other words such an enforcement system would apply only on high seas areas.

To date a long list of recommendations have been adopted by ICCAT relating to particular fisheries as well as with regard to cross-cutting issues relating to by-catch, monitoring and

[195] The EU could also issue quotas for these species.

compliance including the establishment of a joint international inspection scheme, observer programmes, reporting schemes and monitoring measures. Moreover as regards certain fisheries, such as blue fine tuna, ICCAT has set a total allowable catch (TAC) and has set catch quotas for contracting parties as well as cooperating contracting parties.

As regards the subject of the present study the most important ICCAT recommendation is the 'Recommendation Amending the Recommendation By ICCAT to Establish a Multiannual Recovery Plan For Bluefin Tuna in the Eastern Atlantic and Mediterranean of 2008' which has been amended annually since its adoption. Apart from establishing TAC and quotas and other management/conservation measures, this recommendation also establishes a 'Regional Observer Program' and a 'Scheme of Joint International Inspection' based around flag State jurisdiction and implemented through ICCAT inspectors, appointed for that purpose by the governments of the contracting parties and notified to ICCAT, based on vessels that fly an ICCAT approved flag. Such inspectors have the power to stop, board and inspect vessels operating in waters outside the jurisdiction of the State in which they are registered. In other words ICCAT inspectors can stop and inspect vessels flying the flags of ICCAT contracting parties on the high seas. They cannot, however, stop and inspect such vessels within the territorial sea or EEZ (or derivative zone) of a (Mediterranean) coastal State, even one which is party to ICCAT. In this connection the establishment of EEZs or relevant derivative zones would have the impact of reducing the scope of international control and inspection activities undertaken through ICCAT. In terms of EEZs or derivative zones established by EU Member States the Control Regulation would apply and it would appear reasonable to assume that inspection and enforcement would be strengthened (especially as enforcement under ICCAT is based on flag State responsibility). In the case of EEZs or relevant derivative zones established by non-EU coastal States the impacts will depend on the control and inspection capacities of the coastal State involved. If these are weak then the establishment an EEZ or relevant derivative zone would reduce the scope for ICCAT control and inspection although as already mentioned many non-EU coastal States have already in fact established EEZs or fisheries related derivative zones.

Finally it is worth noting that VMS has been mandatory since 1 January 2010 for vessels over 15 metres length overall fishing for eastern Atlantic and Mediterranean bluefin tuna.[196]

### 4.3.3 The GFCM Agreement

As regards the GFCM Agreement it is hard to see the establishment of EEZs or relevant derivative zones by EU Member States having a particularly significant impact in terms of fisheries management.

A performance review recently commissioned by the GFCM found *inter alia* that the GFCM Agreement is weak and outdated with a number of fundamental areas in need of improvement through amendment or even the replacement of the agreement. In terms of compliance and enforcement the review panel also noted problems as regards uneven compliance and enforcement of GFCM Recommendations by members as well as in terms of the provision of required information. Many of the challenges for the GFCM, and for the implementation and enforcement of any conservation measures that adopts undoubtedly arise from the fact that large areas of the Mediterranean remain within the high seas regime meaning enforcement is dependent on flag State action.

[196] ICCAT Recommendations [03-14], [06-05] and [07-08]. The ICCAT VMS was established by the adoption of three primary recommendations [Rec. 03-14], [Rec. 06-05] and [Rec. 07-08]. According to these measures, each Contracting Party, Cooperating non-Contracting Party, Entity or Fishing Entity (CPC) must use a VMS for all commercial fishing vessels exceeding 24 m overall length as of November 1, 2005. Furthermore, as of January 1, 2010, this measure also applies to vessels over 15 m fishing eastern Atlantic and Mediterranean bluefin tuna.

While there is no reason in theory why an improved high seas fisheries control, surveillance and enforcement regime could not be agreed among the GFCM members, in respect of the vessels that fly their flags (by far the majority of fishing vessels in the Mediterranean) in practice this might be difficult to achieve not least due to the careful and correct position of the EU in terms of seeking to work within the GFCM rather than to dominate it.

Partly because it has largely relied on flag State action, enforcement has historically a somewhat challenging issue for the GFCM. Nevertheless the GFCM has established a procedure for the nomination of Fisheries Restricted Areas.

Finally mention can be made of a 2009 GFCM Recommendation whereby each party (and cooperating non-contracting party) is required to establish a VMS system for its commercial fishing vessels exceeding 15 meters length overall by 31 December 2012.197

In any event as already noted most of the non-EU Mediterranean States have already claimed an EEZ or EFZ. Moreover the GFCM Agreement applies to the entire Mediterranean, including the territorial waters of the parties.

Given that fish stocks in the Mediterranean are shared, the EU has an interest in the creation of a strong GFCM, while at the same time respecting the different stages of development of some of its fellow GFCM members and the resources available to them in terms of the promotion of effective fisheries management. This sensitivity and the need to promote the GFCM as an effective organisation partly explain why the EU did not seek unilaterally to create a no-take zone in the Gulf of Lions but rather sought to have a Fisheries Restricted Area established through GFCM. While there is no reason in theory why an improved high seas fisheries control, surveillance and enforcement regime could not be agreed among the GFCM members, in respect of the vessels that fly their flags (by far the majority of fishing vessels in the Mediterranean) in practice this might be difficult to achieve given the resource constraints of a number of the EU States.

## 4.4 Maritime surveillance and security

Although maritime surveillance and security are, as already noted, 'hot' issues in the Mediterranean, the establishment of EEZs would in fact appear to have relatively few direct legal consequences other than as regards the fisheries sector. This is because, as described in section 2.6.3.3 the powers of a coastal State within its EEZ or relevant derivative zone in terms of surveillance and security are restricted essentially to the enforcements of the rights that it enjoys within its EEZ, namely those rights relating to (lawful) economic activities and environmental protection. As far as, say, the smuggling of people or illegal goods is concerned, the presence or otherwise of an EEZ is largely irrelevant as regards the competence of a coastal State is concerned.

In practical terms the only major impact is that coastal States would be entitled to establish mandatory VMS regimes as regards all vessels fishing in their respective EEZs. In the context of the Mediterranean VMS is already mandatory for EU and third country vessels longer than 15 metres in EU waters (pursuant to the CFP) as well as under the ICCAT and GFCM regimes as described above.[198]

[197] Recommendation REC.MCS-GFCM/33/2009/7concerning minimum standards for the establishment of a Vessel Monitoring System (VMS) in the GFCM area http://151.1.154.86/gfcmwebsite/Docs/RecRes/REC.MCS-GFCM_33_2009_7.pdf

[198] As of 1 January 2013 in the case of the GFCM.

Third country fishing vessels would continue to enjoy the right of innocent passage provided their gear is stowed and they do not engage in fishing activities. Moreover such vessels could be required to comply with maritime identification procedures while within the relevant EEZ.

In terms of direct consequences, therefore, the main question is therefore whether or not improved fisheries surveillance and enforcement would result from establishment of EEZs or relevant derivative zones by EU Member States. In terms of indirect consequences, however, the establishment of VMS regimes within EEZs or relevant derivative zones in the Mediterranean would permit the compiling of a more complete overall maritime 'picture', in surveillance terms, given that fishing vessels within those zones would be clearly identified.

## 4.5 Environmental protection and MPAs

In terms of international law, the establishment of EEZs or relevant derivative zones in the Mediterranean would have appear to have significant positive impacts as far as environmental protection measures are concerned particularly as regards the establishment of MPAs. Of course the scope of coastal State normative jurisdiction would, as outlined above, be limited as regards vessel source pollution. Nevertheless the establishment of EEZs would greatly facilitate not only the establishment of MPA in the Mediterranean but also the application and enforcement of the rules relating to such MPAs.

In terms of the Barcelona Convention, it is hard to see that there would be any negative particular impacts as far as the establishment of EEZs or derivative zones are concerned. Indeed although the Pelagos Sanctuary has demonstrated the possibility of establishing a high seas MPA, the limitations of this approach due to the need to rely only on flag State enforcement are obviated if MPAs, including SPAMIS, are established within EEZs or relevant derivative zones. In other words the establishment of EEZs or relevant derivative zones would appear to potentially provide significant benefits in terms securing the objectives of the Barcelona Convention. Similar observations can be made as regards ACCOBAMS and the establishment of MPAs advocated in terms of that instrument.

Moreover the establishment of EEZs or relative derivative zones in the Mediterranean by EU Member States would have result in the expansion of the scope of application of a number of EU instruments relating to environmental protection resulting in a higher level of protection for those parts of the Mediterranean falling within such zones albeit at a potentially increased financial cost in terms of implementation and enforcement for those States concerned. The key EU instruments that fall to be considered under this heading are the Marine Strategy Framework Directive, the Habitats Directive and the Birds Directive.

### 4.5.1 Marine Strategy Framework Directive

The Marine Strategy Framework Directive (MFSD)[199] constitutes the environmental pillar of the IMP[200].

The MFSD requires the Member States to "take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the

[199] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy OJ L 240, 10.7.2004, p. 17.
[200] Recital 3 of the Directive.

latest" (Art. 1 (1)).[201] The Directive does not directly restrict any maritime activities, such as oil, gas and gravel extraction, shipping and fishing.

Instead the definition of "good environmental status" is based on a list of generic qualitative descriptors contained in an Annex to the MFSD, stipulating, for example that biological diversity should be maintained (No. 1), that populations of all commercially exploited fish and shellfish in that Region are within safe biological limits (No. 3), that human-induced eutrophication is minimised (No. 5), or that sea floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected (No.6), that the permanent alteration of hydrographical conditions does not adversely affect marine ecosystems (No. 7), that the properties and quantities of marine litter do not cause harm to the coastal and marine environment (No. 10) and that the introduction of energy, including underwater noise, is at levels that do no adversely affect the marine environment (No. 11).

For the purpose of achieving good environmental status, marine strategies are to be developed and implemented in order: to protect and preserve the marine environment, prevent its deterioration, or, where practicable, restore marine ecosystems in areas where they have been adversely affected; and to prevent and reduce inputs in the marine environment with a view to phasing out pollution so as to ensure that there are no significant impacts on or risks to marine biodiversity, marine ecosystems, human health or legitimate uses of the sea (Art 1. (2)).

The MFSD applies to all 'marine waters', which are defined in Art. 3(1) to mean the waters, seabed and subsoil that extend from the baseline of the territorial sea to the 'outermost reach of the area where a Member State has or exercises jurisdiction'.

In other words if a Member State has not claimed a maritime zone beyond its territorial sea, then the MFSD will apply only within the territorial sea (of course a territorial sea of less than 12 nm can be claimed, meaning that the scope of the MFSD will be reduced accordingly). If a Member State has claimed an EEZ or derivative zone then the MFSD will apply to the outermost boundary of the EEZ or derivative zone. It follows that the obligations of a Member State that has claimed an EEZ (or derivative zone) that extends out to 200 nm from the baseline are notionally greater in spatial terms than those of a Member State that has claimed or more modest EEZ (or equivalent).

In implementing their obligations under the MFSD, Member States must take account of the fact that marine waters subject to their sovereignty or jurisdiction form of an integral part of four marine regions namely the Baltic Sea, the North East Atlantic Ocean, the Mediterranean Sea and the Black Sea. Art. 4(2) goes on to provide that Member States may, in order to take into account the specificities of a particular area, implement the Directive by reference to subdivisions of the marine regions provide these are defined in a manner compatible with a number of marine sub-regions. In the Mediterranean these are: (i) the Western Mediterranean Sea; (ii) the Adriatic Sea; (iii) the Ionian Sea and the Central Mediterranean Sea; and (iv) the Aegean-Levantine Sea.

[201] It is also to be noted that Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1) (the WFD) also applies to 'transitional waters' and 'coastal waters'. 'Coastal waters' are defined to include waters extending out to one nm from the baseline from which the breadth of the territorial sea is measured[201]. However, the term 'surface waters' is defined so as to include coastal waters as well as the territorial sea (described in the directive as the territorial waters) for some specific purposes.

The Member States were required to notify the Commission of any such subdivisions on or around 15 July 2010, the date by which they were required to transpose the Directive into their national legislation. However while the EURLEX website sets out the notified transposition measures it does not refer to such notifications. The Member States were next required to draw up a marine strategy for their marine waters which should follow a common approach in terms of a preparation stage (comprising an initial assessment, a determination of 'good environmental status', the establishment of environmental targets and the establishment of a monitoring programme) followed by the development and entry into operation of a programme of measures (Art. 5).

In order to achieve coordination so as to ensure a coherent approach across marine regions and sub-regions, Member States are required to use relevant existing regional cooperation structures including those under Regional Seas Conventions. In the case of the Mediterranean this is obviously the Barcelona Convention, which is mentioned in the recital to the MFSD.

The MFSD clearly states that MPAs must be part of the national programmes of measures. Article 13 (4) states:

> Programmes of measures established pursuant to this Article shall include spatial protection measures, contributing to coherent and representative networks of marine protected areas, adequately covering the diversity of the constituent ecosystems, such as special areas of conservation pursuant to the Habitats Directive, special protection areas pursuant to the Birds Directive, and marine protected areas as agreed by the Community or Member States concerned in the framework of international or regional agreements to which they are parties.

Apart from MPAs, the MFSD gives only general indications as to what type of measures must be taken to achieve a good environmental status. Measures proposed for inclusion in programmes of measures include *inter alia*[202]*:*

- Input controls: management measures that influence the amount of a human activity that is permitted.
- Management coordination measures: tools to ensure that management is coordinated.
- Spatial and temporal distribution controls: management measures that influence where and when an activity is allowed to occur.
- Mitigation and remediation tools: management tools which guide human activities to restore damaged components of marine ecosystems.

But given that 80% of marine pollution is shore based it is not immediately clear to what additional measures would be necessary in addition in an EEZ. Presumably the other main source of pollution is from shipping, in respect of which a coastal State has no unilateral legislative competence (because as already described shipping standards are implemented through IMO). Fisheries too may impact on marine ecosystems but again this is an area in respect of which the coastal States have no legislative competence, rather the EU does under the CFP. On the other hand claiming EEZs or equivalent would impact on the assessment and monitoring process in the sense that Member States would be required to monitor increased maritime areas.

The MFSD does seek to promote the integration of environmental considerations into all relevant policy areas by requiring that:

> Member States shall integrate the measures […] into a programme of measures, taking into account relevant measures required under Community legislation, in particular Directive 2000/60/EC, Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment and Directive 2006/7/EC

[202] See Annex VI dealing with Programmes of measures referred to in Articles 13(1) and 24.

> of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality, as well as forthcoming legislation on environmental quality standards in the field of water policy, or international agreements.

The MFSD recognises that measures regulating fisheries management can be taken in the context of the CFP and specific measures for fishery conservation are not subject of the directive. However, as its recitals 31-33 and Article 13 (5) indicate, there is a 'passerelle' provision from the MFSD towards the CFP. The CFP must take into account the environmental impact of fisheries as well as the goals of the MFSD. The link between sustainable fisheries management and a comprehensive nature protection regime is thus provided in principle.

### 4.5.2 The Birds Directive and the Habitats Directive

The Birds Directive[203] and the Habitats Directive[204] are *inter alia* the means by which the EU meets its obligations as a signatory of the Convention on the Conservation of European Wildlife and Natural Habitats[205] (the 'Berne Convention'). The Birds Directive calls for the establishment of Special Protected Areas (SPAs) for birds, while Special Areas of Conservations (SACs) for habitats or species are implemented through the Habitats Directive.

Formerly there was a lack of clarity as to whether or not the two directives apply in the marine environment in the EEZ (or derivative) or on the continental shelf. It is now settled law, however, that both directives also apply to the EEZ (or relevant derivative zone) as well as territorial waters.

The geographical coverage was referred to by the Commission[206]:

> … if a Member State exerts its sovereign rights in an exclusive economic zone of 200 nautical miles (for example, the granting of an operating license for a drilling platform), it thereby considers itself competent to enforce national laws in that area, and consequently the Commission considers in this case that the "Habitats" Directive also applies, in that Community legislation is an integral part of national legislation.

As the Habitats Directive regulates habitats beyond 12 nm offshore (listed in Annex 1 are "reefs" and "submerged sandbanks") and species occurring in the EEZ, its functional jurisdiction should be beyond doubt.

There is also political agreement at EU level that the Directives apply to the EEZ of those EU Member States that have declared EEZs. The Council of Ministers has also encouraged the Member States 'to continue their work towards the full implementation of the Birds and Habitats Directives in their exclusive economic zones'[207]. As to Member States not having declared an EEZ, following a ruling of the UK High Court, the Habitats Directive was found to

[203] Council Directive of 2 April 1979 on the conservation of wild birds (79/409/EEC) OJ L 103, 25.4.1979, p. 1.
[204] Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora OJ L 206, 22.7.1992, p. 7.
[205] Berne, 19 September 1979; 1284 UNTS 209.
[206] COM (1999) 363 final Communication from the Commission to the Council and the European Parliament "Fisheries Management and Nature Conservation in the Marine Environment" (p10)
[207] 2344th Council Meeting, Fisheries, 25 April 2001, Council Conclusions on the integration of environmental concerns and sustainable development into the Common Fisheries Policy, 8077/01, Luxembourg.

apply to the UK Continental Shelf, and the waters above the seabed, up to a limit of 200 nautical miles from the baseline.[208]

Thus each Member State is required to establish a national list of sites in proportion to the representation within its territory of the natural habitat types and the habitats of species listed in the Directives.

Despite the apparent readiness of Member States to act, however, progress in conserving Europe's marine biodiversity has been rather limited, especially as regards the impact of fisheries. A major constraint for the designation of fully-fledged MPAs has resulted from uncertainty as to who has competence for placing restrictions on commercial fishing activities: the EU or the Member States.

On the one hand Member States are responsible for the protection of sites (i.e. designated under the Birds and Habitats Directives) while on the other hand their ability to regulate fisheries activities has been unclear. The question at stake was if such restrictions may be based on legislation implementing the Habitats-Directive or may only be taken in the context of the CFP, and by whom – either by the Member State unilaterally or by the Council. As the answer to these questions has not been clear for quite some time, there was the urgent need for clarification[209]. In 2007 the European Commission issued guidelines for the establishment of the Natura 2000 network in the marine environment as well as a paper on the introduction of fisheries measures for marine Natura 2000 sites in order to give guidance to Member State authorities when preparing and requesting fisheries management measures under the CFP. These documents are not, however, of a legally binding nature.

As regards the Habitats Directive the main implications for EU Member States of establishing EEZs or derivative zones in the Mediterranean are as follows.

In terms of its requirements, the Habitats Directive requires the establishment of a coherent European ecological network of special areas of conservation (SAC) to be set up under the title 'Natura 2000'. The network is to include: (a) sites hosting the natural habitat types listed in its Annex I; and (b) habitats of the species listed in Annex II, so as enable such habitat types and species habitats to be maintained at a favourable conservation status.

Natura 2000 also includes special protected areas (SPAs) established pursuant to the Birds Directive. Each Member State is required to contribute to Natura 2000 in proportion to the representation within its territory of the natural habitat types and the habitats of species. The basic procedure is for each Member State to propose a list of sites to the European Commission which then in establishes a draft list of sites of Community importance. Once the list of sites of Community importance is established the Member States have to designated such sites as SACs and establish priorities for them.

Member States must also establish the necessary conservation measures for SACs including as necessary management plans and other statutory, administrative or contractual measures. In addition Member States are under a duty to take appropriate steps to avoid the deterioration of national habitats and the habitats of species within SACs as well as the significant disturbance of such species. Moreover plans or projects that may have significant impacts on SACs, even if not directly connected with them, must be subject to an appropriate assessment. Plans or projects with a negative assessment may only be carried

[208] The Queen v. The Secretary of State for Trade and Industry *ex parte* Greenpeace Limited Case No: CO/1336/1999.

[209] For a comprehensive analysis as to the legal questions involved, see Owen, D., "Interaction between the EU Common Fisheries Policy and the Habitats and Birds Directives", Institute for European Environmental Policy, 2004.

out for imperative reasons of overriding public interest, including those of a social or economic nature and provided all compensatory measures are taken to protect the overall coherence of Natura 2000.

The possibility of co-financing Natura 2000 sites is raised in article 8 of the directive. Member States are required to undertaken surveillance of the conservation status of natural habitat types and species. The types of marine habitat listed are:

1. 1110 *"sandbanks which are slightly covered by sea water all the time"*
2. 1170 *"reefs",* and
3. 1180 *"submarine structures made by leaking gases"*

As regards species conservation Member States must take requisite measures to establish a system of strict protection for the animal species listed in Annex IV of the directive which include *Phocoena phocoena* and *Tursiops truncates* and also some turtles *Caretta caretta* amd *Chelonia mydas*.

The Habitats Directive applies to the continental shelf and to any maritime zones claimed by Member States. In other words if the Mediterranean States claim EEZs or relevant derivative zones then the directive will apply additionally to the water column.

The directive already applies to the continental shelf in the Mediterranean although the Commission has not emphasized the application of the directive to the continental shelf in the Mediterranean on the grounds that maritime boundaries are not clear. The correctness of this approach may be open to question not least because a number of continental shelf boundaries involving EU Member States have in fact been agreed (in the Adriatic Sea for example).

Basically SACs must be established if they contain various habitat types listed in Annex I or of if they are the habitats of the species types listed in Annex II. All of the marine habitat types are located on the sea bed and thus already covered by the continental shelf claims. However the water column may provide the habitat of relevant species listed in Annex 2. Interestingly when the UK unsuccessfully tried to argue that the directive does not apply beyond the territorial sea it was to prevent additional costs for the oil and gas industry in terms of the disturbance of dolphins through acoustic testing activities and (drilling on) certain reefs.

In short the establishment of EEZs or relevant derivative zones by the EU Mediterranean States would lead to an increase in the spatial scope of the Habitats Directive and thus theoretically a higher level of protection of critical species and habitats. At the same time though the implementation of the directive would lead to increased costs on the part of the Member States concerned.

In terms of the costs of implementing the directive the first step will usually be to identify the presence and location of Annex II species. The implementation guide suggests at page 49 that Greece, Italy and Cyprus lack much of this data. Similar comments can be made about offshore aggregation habitats for sea birds. According to the implementation guide the next steps are to prepare management plans and then to declare the relevant protected areas. The problem is that most of the types of activity that are then addressed are land based. Examples of the kinds of human activities that may impact on MPAs are set out in the implementation guide from page 91 onwards. Interestingly there is a reference to military activities.

## 4.6 Exploitation of non-living resources

It is hard to see how the establishment of EEZs would have any significant impact as regards the exploitation of non-living resources (such as oil and gas) for the simple reason that the continental shelf regime confers what is for most purposes an identical bundle of exclusive 'sovereign rights' as regards the exploring and exploiting minerals and other non-living resources of the seabed and subsoil.

Coastal Mediterranean States already make use of such rights in terms of, for example, gas abstraction in the Adriatic Sea. As already noted the rights of coastal States to make navigation/safety rules around such structures are identical, irrespective of whether such platforms are established on the basis of EEZ or continental shelf rights.

## 4.7 Dumping

The legal regime for the dumping of wastes at sea is essentially the same as regards dumping within the EEZ as it is in relation to dumping onto the continental shelf: in both cases the express permission of the coastal State is required.

Leaving aside the fact that as far as the EU Mediterranean States are concerned there are strict limits on at-sea waste disposal under EU environmental law, the overall impact of claiming an EEZ would be negligible given that any such EEZ would lie directly above the continental shelf of the coastal Member State concerned.

## 4.8 Laying of pipelines and cables

Given that the rules relating to the laying by a third country of pipelines and cables on the seabed within an EEZ are essentially identical to those applicable to the continental shelf it is difficult to see what additional legal consequences would arise from the establishment of EEZs in the Mediterranean with respect to this issue.

## 4.9 Offshore renewable power generation

The weak tides of the Mediterranean mean that options for renewable offshore power generation are probably limited to wind energy. However, although article 56 of UNCLOS expressly includes wind energy production as an activity in respect of which a coastal State enjoys sovereign rights within its EEZ, in practice the establishment of EEZs is likely to make little significant difference. This is because wind energy platforms would in any event need to be fixed to the seabed and thus the approval of the coastal State would be necessary on this basis of the rights arising out of the continental shelf regime.

To date there has been relatively little development of wind energy in the Mediterranean, for the most part because unlike the relatively shallow North and Baltic Seas, the seabed falls steeply from the coast. Consequently there are relatively few sites that are suitable for wind energy platforms that can be built directly on the seabed. The technology for floating platforms, such as the Norwegian 'Hi-Wind', which is still being developed may in due course prove suitable for the Mediterranean, but even such floating platforms must be permanently anchored to the seabed and thus arguably the continental regime would once again enter into play.[210]

[210] Although this argument would depend on such platforms being classed as installations on the continental shelf. The point is that floating wind energy platforms were most probably not envisaged when UNCLOS was being negotiated.

## 4.10 Military activities

As described in Section 2.6.9, military vessels basically enjoy the right of freedom of navigation within the EEZ as well as the high seas. In terms of military exercises it does not appear that any Mediterranean States have sought to claim that their permission is required before these can take place within their EEZ. In any event most, but not all, of the EU Mediterranean States are members of the North Atlantic Treaty Organisation (NATO) meaning that it is unlikely that such types of claim will arise in the near future against other non-Mediterranean NATO members (such as the USA).

However, modern navies are increasingly sensitive to the environmental impacts of their activities. Holding a military exercise in an MPA would not generate very good publicity.

To the extent that MPAs can be more easily established and enforced within an EEZ, the establishment of a more robust network of MPAs in the Mediterranean might have an indirect negative impact on the holding of military exercises and a corresponding positive impact on noise sensitive species such as cetaceans.

## 4.11 Marine scientific research

The establishment of EEZs or derivative zones would have significant positive impacts for coastal States in terms of their rights to control and benefit from marine scientific research undertaken in areas which currently form part of the high seas. Specifically, as outlined above, the consent of the coastal State is required In terms of the Mediterranean the benefits to coastal States might however be weighed against the loss of opportunity of other States, including other Mediterranean States to gather scientific data given that the permission of the coastal State would always be required. In terms of pure research, as described above, there is a presumption that consent should be granted.

Nevertheless it may not always be easy in practice to determine between pure and applied research especially where fisheries resources are concerned. While UNCLOS also makes provision for an implied consent regime the fact remains that researchers will usually seek to obtain coastal state consent which can be a time consuming process even if the relevant coastal State has put the necessary legislation and consent procedure in place.

Moreover if consent is refused there will often be little if any recourse other than high-level inter-State negotiation. Interviews with researchers in the Mediterranean undertaken during the course of the preparation of this Study strongly suggested that the effective ‘enclosure’ of existing high seas areas as a result of the establishment of EEZs or derivative zones would have a negative impact on research. UNCLOS is unsurprisingly silent as to the precise impacts on research of derivatives zones. It would seem logical to suppose, however, that research would be subject to the EEZ regime only to the extent to which a derivative zone affects a given area of research. In other words fisheries research would be *prima facie* subject to the consent regime following the establishment of, say, an EFZ and so on. Each situation would depend on the precise wording of the national legislation used to establish the derivative zone.

As regards the potentially valuable biological resources of the seabed, bio-prospecting is essentially subject to the existing continental shelf regime. Basically the permission of the coastal State would be required as regards scientific research even if the superjacent water column and surface is not subject to an EEZ claim. However in terms of enforcement the ability to regulate all scientific research activity within the EEZ would strengthen the position of the coastal State vis-à-vis illegal research on the seabed undertaken simultaneously with and under cover of legal research in the water column.

## 4.12 Wrecks and other historical sites

Given that wrecks and other historical sites are located on the seabed, which is subject to the continental shelf regime, the establishment of EEZs in the Mediterranean would have no impact on the protection of its extensive underwater cultural heritage.

The key point to note is that the continental shelf regime applies to wrecks and historic sites and so declaring EEZs would have no effect.

## 4.13 Maritime Spatial Planning

Increased activity within Europe's marine waters has led inevitably to growing competition for finite maritime space. The challenge, though, is not maritime activities are unregulated or indeed unplanned (indeed the contrary is usually true), rather that they are planned and regulated on a sectoral basis by different agencies each with its own specific legislative approach to the allocation and use of maritime space. Without the means to coordinate a common approach to the allocation of maritime space for different sectors, the risk of problems of overlap and conflict between sectors and individual stakeholders is evident. There are also cross-border issues where developments in one European country (e.g. creation of a wind farm) may have implications for another country (e.g. visual or access impacts). For example, in the context of the North Sea, the creation of windfarms in German, Belgian and UK waters have implications for maritime transport routes and access to Dutch ports.

The relatively new notion of 'Maritime Spatial Planning' (MSP) has emerged as a key means of resolving inter-sectoral and cross-border dipsutes over maritime space. MSP is a process which has the aim of establishing a binding plan which organises all economic and ecological activities in a given geographical sea area. The need for and the level of detail of such plans will depend on the intensity of use within that sea area. In terms of MSP an EU coastal State will clearly need to take into account the fact that certain activities may be regulated under international law (such as shipping) or EU law (such as fisheries under the Common Fisheries Policy) and that its authority to identify space for maritime activities in the MSP process is limited accordingly. A key objective of the coastal State in such circumstances is to ensure coordination with the relevant regulatory authorities for such activities during the MSP process so that the activities of those policy areas a reflected in the plan. In Norway for example, national planning authorities co-operate closely with IMO authorities to ensure that maritime transport routes in Norwegian waters established under the purview of IMO are duly reflected in the Norwegian plans in harmony with other maritime activities.

As noted by the Commission in the MSP Roadmap Communication, MSP is an important tool for the development of the IMP. In particular the Commission found that 'the use of MSP will enhance the competitiveness of the EU's maritime economy, promoting growth and jobs in line with the Lisbon agenda'.[211].

Moreover a stable planning framework providing legal certainty and predictability will promote investment in such sectors, which include offshore energy development, shipping

[211] MSP Communication at page 3. The Lisbon Agenda has now, of course been superseded by the Europe 2020 agenda. *It is to be noted that the European Commission adopted a proposal for a Directive on MSP on 13 March 2013: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0133:FIN:EN:PDF*

and maritime transport, ports development, oil and gas exploitation and aquaculture, boosting Europe's capacity to attract foreign investment.

Other benefits of MSP identified in the MSP Communication include the possibility of increasing the effectiveness and coherence of EU and national policies, reducing economic costs of non-coordination, the promotion of a common approach among Member States that takes account of cross-border impacts, creating, in the context of the Internal Market, a basis for simplified permit systems and thus for reducing the costs of regulatory and administrative procedures, thereby providing transparent and reliable planning as well as providing an appropriate forum for Member States to discuss and develop a holistic approach to the management of maritime activities in line with ecosystem requirements.

In its more recent communication 'MSP – Achievements & Developments' the Commission drew three main conclusions from the experience gained on MSP since the launch of the EU IMP and the Roadmap Communication on MSP namely that: (a) consultations revealed broad agreement on the need for a common approach on MSP and confirmed an interest to develop MSP further at EU level; (b) that a more coherent common approach would significantly enhance the potential value of MSP for the EU as a whole, as well as in a sea basin context; and (c) that the increased need for coordinated planning of sea basins, both in the context of current economic developments and in the context of the implementation of EU policies and legislation, would benefit strongly from MSP, as this policy would set out parameters that facilitate cross-border cooperation on MSP among Member States.

It has become commonly accepted that that the coastal state has the authority to set up a MSP process for waters under its sovereignty or jurisdiction, taking into account its obligations under international law.

As we noted in a previous Study, EU Member States encounter relatively few constraints under international or EU law to identify space for maritime activities in their internal waters and territorial seas during the planning process.[213] Subject to the duty not to hamper innocent passage of foreign vessels, spatial planning involving prohibition of fishing is within the coastal State's power, while regulating navigation by way of shipping lanes requires no more than consultation with the IMO. It is also necessary to consult relevant neighbouring States regarding plans or projects in the territorial sea likely to have a significant adverse environmental impact across boundaries.

It should be noted that a legally binding protocol on integrated coastal zone management has been agreed upon within the framework of the Barcelona Convention. Given that the concept of Integrated Coastal Zone Management also includes planning, the Mediterranean States are already under the obligation to carry out integrated planning of their activities in the geographical area covered by this protocol.

Within the EEZ the coastal State is free to identify the necessary space in the planning process for the most important marine related activities including exploring and exploiting, conserving and managing living and non-living natural resources. The main constraints where the planning of activities have to take place in consultation other competent authorities derive firstly from other States' freedom of navigation: within the EEZ coastal States are barred from unilaterally defining sea lanes for international navigation but have to rely on multilateral cooperation with the competent authorities of the IMO. Secondly coastal States only have a limited influence on the laying of cables and pipelines of other States only passing through their EEZ or on their continental shelf: they may dictate where the cable or pipeline runs, but may not prevent its laying.

[213] MRAG Limited, *Legal Aspects of Maritime Spatial Planning*, 2008. http://ec.europa.eu/maritimeaffairs/documentation/studies/spatial_planning_en.htm

With regard to their continental shelves coastal States can take unilateral spatial planning measures only in connection with activities relating to exploring and exploiting, conserving and managing the living and non-living natural resources. Co-operation with other authorities are necessary within the field of navigation, the laying of cables and pipelines, scientific research and, on any part of the shelf more than 200 nm from the baseline, fishing in so far as the gear does not come into contact with the seabed.

As to the high seas, including in this connection the water column above the continental shelf in those cases where no EEZ has been claimed, there is in principle no room for individual coastal States to carry out MSP given that spatial planning that is enforced against third country activities on the high seas would infringe the prohibition on subjecting the high seas to national sovereignty. In these cases, MSP can only be carried out through international co-operation between the concerned States.

The consequences for the Mediterranean are therefore as follows. Those States that have not claimed an EEZ will only be able to set up a MSP process with regard to the territorial sea and can only allocate space for those sea-bed activities that take place on the continental shelf. This situation however does not impede the different national authorities from cooperating in the context of multilateral and regional conventions for the planning of activities in those sea areas taking place beyond the territorial sea in a similar manner as fishing activities on the high seas are regulated by RFMOs. As regards coastal zones, planning the sea space is already a component of the legally binding protocol on integrated coastal zone management under the Barcelona Convention.

As regards those States that have claimed derivative maritime zones, such as fishing zones or ecological protection zones, however, the right to allocate space will be limited to the legal scope of those zones in terms of the relevant national legislation. In this connection the importance of MSP needs to be emphasized in terms of investment decisions and legal certainty.

Finally in terms of the relationship between MSP and other emerging EU policies, it is appropriate to mention MSP can support the process of developing mandatory maritime traffic services and appropriate ships' routing systems as well as in promoting initiatives such as “Motorways of the Sea” and a "European maritime transport space without barriers".

The development of “Motorways of the Sea” was originally proposed by the European Commission in its Transport White Paper of September 2001[214], sometime before work began on the development of the IMP. The Motorways of the Sea are envisaged as providing a genuine competitive alternative to land transport and are funded as part of the Trans-European network (TEN-T).

Among the four corridors that have been designated for the setting up of projects of European interest, two relate to the Mediterranean namely: (a) the Motorway of the Sea of south-east Europe (connecting the Adriatic Sea to the Ionian Sea and the Eastern Mediterranean, including Cyprus); and (b) the Motorway of the Sea of south-west Europe (western Mediterranean, connecting Spain, France, Italy and including Malta and linking with the Motorway of the Sea of south-east Europe and including links to the Black Sea).

## 4.14 Conclusion - impacts on maritime activities of the establishment of maritime zones

[214] COM (2001) 370) of 12/09/2001.

In conclusion the legal impacts of establishing EEZs in the Mediterranean can be summarised in Table 3 as follows:

| Activity | Impact | Comments |
|---|---|---|
| Safety of navigation & vessel source pollution | ρρ | Although the establishment of an EEZ or relevant derivative zone would not allow a coastal State to unilaterally adopt and impose rules relating to the safety of navigation or vessel source pollution within that zone it would permit the coastal State to enforce rules relating to the safety of navigation and vessel source pollution adopted at the international level through IMO within the EEZ or relevant derivative zone through the application of sanctions against vessels/vessel owners. |
| Fisheries | ρρρ | Under international law the establishment of an EEZ or relevant derivative zone enables a coastal State to adopt and enforce rules relating to management measures and regulating access to fisheries by third country vessels within such a zone. Non-EU flagged vessels could be excluded from the EEZs or relevant derivative zones of EU Member States although pursuant to the CFP EU flagged vessels could not. Management rules would be adopted by the EU pursuant to the CFP although responsibility for enforcement would lie with the relevant coastal State. Significant benefits as regards enforcement could be expected. |
| Maritime surveillance and security | ρ | In terms surveillance and security the impacts of establishing an EEZ or derivative zone would not be significant given that the increased rights of a coastal State would relate only to the exercise of the sovereign rights of the coastal State which relate primarily to economic activities (in particular fishing) and environmental protection. Other aspects of surveillance and security, such as terrorism and smuggling, would not be impacted by the establishment of an EEZ or relevant derivative zone. |
| Environmental protection and MPAs | ρρρ | The establishment of an EEZ or relevant derivative zone would have a potentially significant impact regarding environmental protection and the establishment of MPAs. In particular it would enable a coastal State to adopt and enforce environmental protection rules (other than as regards the safety of navigation and vessel source pollution) and to establish MPAs and to adopt and enforce rules relating to such MPAs, although in the case of EU Member States rules relating to fisheries in terms of MPAs would be made at the EU level. Moreover the impact of establishing EEZs or relevant derivative zones would be to expand the spatial scope of EU environmental protection legislation leading to an improved level of environmental protection for the Mediterranean albeit increased implementation and enforcement costs. |
| Exploitation of non-living resources | ζ | The establishment of an EEZ or relevant derivative zone would have no substantive legal impact given that these activities, namely oil and gas extraction, are already subject to the continental shelf regime. |
| Dumping | ζ | The establishment of an EEZ or relevant derivative zone would have no substantive legal impact given that dumping is already subject to the continental shelf regime. |
| Laying of pipelines and cables | ζ | The establishment of an EEZ or relevant derivative zone would have no substantive legal impact given that the |

| | | |
|---|---|---|
| | | laying of pipelines and cables is already subject to the continental shelf regime. |
| Offshore renewable energy | ϒ | It is hard to see how the establishment of an EEZ or relevant derivative zone substantive impact given that such activities would in practice also be subject to the continental shelf regime. |
| Military activities | ρ | Although it is doubtful that the establishment of an EEZ or relevant derivative zone would have significant direct impacts in terms of the holding of military exercises by third countries, the rights of third countries to undertake military exercises within such a zone in practice such countries may be deterred from so doing if MPAs have been established there. |
| Marine scientific research | ρρ | The establishment of an EEZ or relevant derivative zone would have a potentially significant impact on marine scientific research in the Mediterranean due to the need to obtain the prior consent of the coastal State. Although such consent should in principle be forthcoming in practice delays and an increased level of uncertainty will likely negatively impact research in those parts of the Mediterranean that are currently subject to the regime of the high seas. |
| Wrecks and other historical sites | ϒ | The establishment of an EEZ or relevant derivative zone would have no substantive impact given that wrecks and historical sites are already subject to the continental shelf regime. |

**Table 3 Legal impacts of establishing EEZs in the Mediterranean**

Key

ρρρ Very significant impact
ρρ Significant impact
ρ Impact
ϒ No identifiable substantive impact

# 5 Cost benefit analysis - methodological approach

## 5.1 General approach[215]

This Study does not relate to the kind of project that is the subject of a typical benefit-cost analysis and, as a result, the standard tools of benefit-cost analysis are not applicable. Cost-benefit analyses (CBAs) typically relate to defined projects or themes (e.g. MPAs, marine ecosystems, or the environment) and to single countries or geographical zones. The main issues relate to the terms of its breadth and scope, and the diversity of countries concerned.

As is clear from Section 3 of this report, international law offers a number of different possibilities as far as the establishment of maritime zones is concerned. In terms of future scenarios a number of different options can be envisaged for those States that have yet to claim EEZs in the Mediterranean ranging from the establishment of derivative zones, such EFZs or EPZs or a combination thereof, through to the creation of full EEZs. Such claims may be made up to the maximum possible breadth (in negotiation with opposite States) or for some lesser distance. Another option though is to further explore alternative approaches such as the establishment of high seas MPAs. The prevailing reality is something of a mosaic as described in Section 3.

Using cost benefit tools, the approach must be broad enough to allow for the evaluation of the situation where there are no zones beyond the territorial sea (the 'no-zone' scenario) as well as various scenarios for change covering the activities that are potentially impacted with a multi-level analysis at the scale of countries, sub-regions and the Mediterranean as a whole. The use of a scenario approach is complicated by the fact that the Mediterranean countries are presently at different stages in terms of the establishment of maritime zones.

The first step in the evaluation process, therefore, is a qualitative definition of the scope of the scenarios, which will generate a set of hypotheses by country that can then be analysed.

An appraisal of the legal and institutional situation leads to a consideration as to the types of changes coastal States might make in terms of the establishment of maritime zones and, for this, the form of the analysis. At one end the scale there is the 'no change' scenario, whereby costs and benefits are assessed by reference to a situation where no zones exist beyond the territorial sea. At the other end of the scale there is the establishment of a full EEZ.

In between are a number of intermediate options such as the establishment of derivative zones such as FPZs or EPZs or a combination thereof whereby coastal States assert less than the full complement of rights afforded by the EEZ regime. Another intermediate option may be the joint establishment of a high-seas MPA such as the Pelagos Sanctuary.

A further option is to assess the costs and benefits establishing EEZs or derivative zones that extend to such as France has proclaimed but not yet implemented. The value of this is that a claim could be made up to the 'line of least conflict' i.e. that which will minimise the transaction costs of negotiating agreements with neighbouring (opposite or adjacent) States.

There may be at least three options for maritime zones to examine in relation to costs and benefits. In determining which option to select a coastal State will have regard *inter alia* to

[215] *It is to be noted that the methodology (and thus the scenarios based upon it), was prepared prior to the claims by France and Spain for full EEZs and does not take into account the impacts of such claims.*

the costs and benefits. In practical terms to gain an initial understanding of the costs and benefits it will be advantageous to simplify a little and analyse them fully in respect of three policy options:

**Option 1** no maritime zones beyond the territorial sea;
**Option 2** partial or intermediate solutions - expansion of the sectoral zone control, high seas MPAs
**Option 3** the establishment of a full EEZ

These options will start as the bases to be tested by the cost benefit and qualitative assessments. The analysis will be used to identify the most cost effective and efficient option. A cost-benefit analysis will be undertaken by selected representative states in sub-regional scenarios which will allow different solutions to be examined for different sub-regions. This should be as quantitative as possible.

## 5.2 Framework for Cost Benefit methodology

A cost benefit analysis could be carried out for each of the 22 coastal States around the Mediterranean with a view to summing them and arriving at a net value for the whole sea with regard to overall benefit. It is, however, more a question of testing the relative 'plusses and minuses' encapsulated in the three options given above which are to be tested as a guide, in principle, as to which option might provide the most advantageous/practical policy outcome to different types of coastal states. It should also be borne in mind that, whilst the guidance should be relevant to the EU, the EU regards non-Member states as partners in the use of the Mediterranean and also that the position of non Member States impinges upon the options of the EU and therefore need to be taken into account. In addition, non-Member States have been very co-operative in providing information for this Study and there is a prevailing message coming from the stakeholders that some uniformity of response with regard to new zones would be better overall. Ultimately, this is a decision of the State and a reflection of its sovereignty which is considered as a factor in its own right (Section 2.4, Section 12.1) as having an overarching influence.

Consequently there are three identifiable components to the practical application of the cost benefit analysis:

- How should it be done?
- What should be included?
- Where should it be applied?

Given the consideration above and the three options to be tested the first point, the specific method needs to be a flexible one. Rephrasing to the above questions in terms of actions there are three elements to the analysis:

- the specific method employed;
- identification through screening of the relevant sectors and activities for inclusion;
- Identification of the most useful scenarios for application of the method.

It will be most useful to look at these steps from the general to the particular essentially in reverse order of the above.

### 5.2.1 Selection of Scenarios for application of CBA

Whilst the Mediterranean is complex physically and in terms of governance, groupings of relatively similar situations can be discerned. The Western Basin is simpler than the Eastern

with less constricted coastlines and fewer archipelagos. However, in both the Western and Eastern basins the situation of the southern states is similar with relatively uncomplicated, unconstricted coastlines with relatively few islands so, with regard to the issues, the situation of the southern countries from Algeria to Egypt is reasonably consistent. This also may be the case for the Levant. The Aegean, however, is a different case completely with its multitude of archipelagos and heavily indented coastlines which will probably present the most difficult situation. The Adriatic with its narrow semi enclosed nature presents another set of issues whilst the narrows of the shelf between the two basins, between Italy and North Africa, also present another identifiable set of problems.

With this diversity in mind a selection of representative countries, particularly those exemplifying particular activities or where data is best available, was made in the form of a series of case studies to analyse in detail the costs and benefits of setting up and administering a type of derivative zone or EEZ . Each case would relate to the groupings of issues outlined above.

Sub regional scenarios have been considered as the most relevant and were to include:

- A scenario involving only Member States;
- A scenario involving Member States and non-Member States;
- A scenario involving a southern non-EU partner country.

A preliminary consideration of which states might be taken as representative might start with the northern sector of the Western Basin. A key country here is France. This is the only country in the Mediterranean which has some experience with both the Territorial Sea and EPZ approach and is thus, an important test case. Italy is another crucial case with extensive coastlines on the Western Basin and on the Adriatic as well as, with Sicily, being key to the bridge between the two basins. Malta is also significant in relation to this last point. On the Adriatic, Croatia is another illustrative case with its creation of an environment and fishing zone (EFPZ). The Adriatic case can be extended to include the Ionian coast of Greece to give a slightly wider applicability.With this in mind whilst also considering the issues exemplified by individual countries outlined above we propose to test the following scenarios:

- The Gulf of Lions and the NW Mediterranean
- The Adriatic and eastern Ionian Sea
- The Straits of Sicily/Malta.

The CBA would need to be applied on a country by country basis which would then be synthesised to provide the sub regional scenario solution. Thus the scenarios are shown by country below (Table 4) and will be seen to conform to the three scenarios agreed with DG MARE.

**Table 4 Selected sub-regional scenarios and constituent countries**

| Sub regional Scenario | Countries |
|---|---|
| Gulf of Lions and NW Mediterranean | France, Spain |
| Adriatic and eastern Ionian | Italy, Croatia, Albania, Montenegro, Greece |
| Straits of Sicily/Malta | Italy, Malta, Tunisia |

These sub regional scenarios are therefore proposed as the units for application of the CBA within which to test the three options in a representative fashion.

### 5.2.2 Specifications of scenarios

The coastal States included in the scenarios are summarised in Table 4 but the actual zones or parts of zones included need to be specified. The Gulf of Lions (Table 4) is a short-hand way of describing the area including the gulf itself, which is largely across the French zones but with some of northern Spanish waters as well as the rest of the Spanish zones of the northwest Mediterranean. An exception to this description will be the consideration of fisheries data (which is dealt with below and in Section 6.1) necessitated by the regions of data aggregation (see Figure 10).

The exceptions to the use of the whole of the coastal state maritime zones are Italy and Greece. Italy appears in two scenarios, the eastern coast in the Adriatic and the southern coast in the Straits of Sicily/Malta. To represent these consistently the areas within a section denoted by a line generated between the point at the intersection of the Italian EEZ and the EEZ of Tunisia and the coast line at Naples whilst the southern boundary follows the median line down from the heel of Italy to its intersection with the EEZ of Malta. Together these are taken to represent southern Italy in the Straits of Sicily/Malta scenario. The eastern coast of Italy is simply those zones within the Adriatic down to the heel of Italy. As with the Gulf of Lions, the Straits of Sicily/Malta is used as a convenient name for this scenario rather than a precise definition.

Greece is present in the scenarios only as the Ionian Sea on its eastern seaboard. The area included is taken as the EEZ represented by the median line parallel to the east coast with a southern boundary taken as a line generated from the eastern EEZ boundary to the southern tip of the Peloponnese.

A key first step for developing the scenarios is to determine their spatial scope in terms of the actual or potential maritime zones to which they apply. The territorial seas, for the most part, are defined but the potential area of an EEZ or derivative zone must be estimated. To do this, the areas for the coastal sates included in the analysis are estimated from the Global Maritime Boundaries Database (Table 5)[216]. This database is a GIS-based commercial product produced by General Dynamic Advanced Information Systems (see link) which has become the industry standard. The layer of data used is that based on an algorithm to determine median lines. These estimates are for the purpose of analysis only and are in no way intended to endorse any claims that are currently outstanding or which may arise in the future.

**Table 5 Area of maritime zones in scenario countries.**

| Scenario Country | TerritorialSea (Km2) | EEZ (Km2) |
|---|---|---|
| **ADRIATIC** | | |
| **Italy** | 51526 | 127850 |
| **Croatia** | 31510 | 23848 |
| **Montenegro** | 2320 | 4093 |
| **Albania** | 6106 | 5098 |

[216] http://www.gd-ais.com/index.cfm?acronym=gmbd

| | | |
|---|---|---|
| **Greece** | 4395 | 7754 |
| **TOTAL Km$^2$** | 114,498 | 168,643 |
| **GULF of LIONS** | | |
| **Spain** | 55196 | 147020 |
| **France** | 24467 | 53535 |
| **TOTAL Km$^2$** | 79663 | 200555 |
| **STRAITS of SICILY/MALTA** | | |
| **Italy** | 77289 | 127850 |
| **Malta** | 3990 | 44020 |
| **Tunisia** | 36880 | 41860 |
| **TOTAL Km$^2$** | 99754 | 213730 |

*Source: Global Maritime Boundaries Database*

Within the Adriatic scenario, Slovenia currently is a special case. Whilst the northern boundary of the territorial sea is agreed with Italy from the days of Yugoslavia, the southern border is at present under dispute with Croatia. This dispute is currently subject to arbitration and should be regarded as *sub-judice.* In terms of the Adriatic and the simple cost benefit models we have developed Slovenia has been omitted since the outcome of the dispute affects the maritime zone status of Slovenia, ie, whether it has or has not the right to an EEZ at the expense of Croatia. Consequently it would be inappropriate to use either assumption and thereby prejudice the case and it would materially affect the outcome of the analysis. As far as Croatia is concerned, however, the outcome of the dispute does not change their status, they still can claim a substantial EEZ it would just lose a small area to Slovenia which will have a minimal impact on the analysis for Croatia. Consequently Croatia has still been included in the model with what might be regarded as a working estimate of the area of it EEZ and territorial sea without prejudice to the arbitration. Another anomalous situation is presented by Bosnia Herzegovina where the geography renders its maritime zones difficult to assess so this has also been excluded from the scenario.

Thus, whilst the coastal States involved in the scenarios and their relevant component zones are described above, amongst the analyses there is one major exception in fisheries. The defining factor here is the data collection areas of the GCFM who provide the database for all fisheries in the Mediterranean aggregated according to those areas. This is the finest geographical solution available. The GFCM data areas are shown in the following figure (Figure 10).

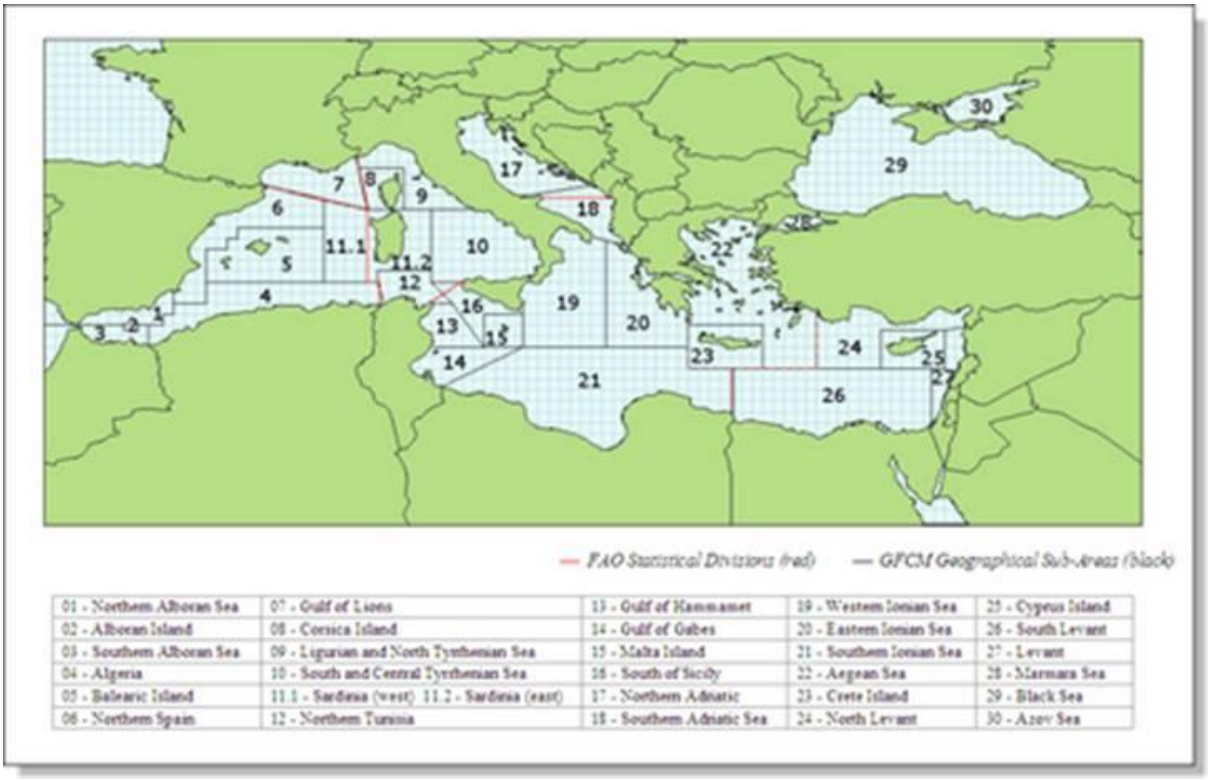



**Figure 10 GFCM fisheries data collection areas**

The scenario fisheries data sources can be defined on the basis of these collection areas:

- The Adriatic is areas 17 and 18;
- The Straits of Sicily is areas 13, 14, 15, 16
- The Gulf of Lions is area 7 as defined.

The Adriatic areas give a well defined block for analysis. Eastern Greece, is not specifically included in the fisheries model since it would involve too many countries not in the scenario (Section 6.2), but it is included in the final analysis based of the catches of Greece in Area 20, Eastern Ionian Sea (Section 13.1).

The area for the fisheries model is rather more circumscribed in the Straits of Sicily than for the other activity models. However, the fact that it is made up of a number of small areas compared to the often large units of GFCM data collection (Figure 10) allows better resolution of data in the allocation of catch by maritime zone by country which is the key to the model.

The area for the Gulf of Lions model is taken to be the area of the same name, ie. Area 7, (Figure 10). This contains all of the waters of France but only a small portion of those of Spain. Nevertheless it does provide a straightforward model to examine the interaction between two member states with respect to fisheries changes with changes in maritime zones. In the final comparative evaluation (Section 12) it needs to be born in mind that the total Spanish fisheries sector is considerably larger than that depicted by the model.

### 5.2.3 Screening for most relevant sectors.

From the earlier Legal Analysis the possible impacts on the jurisdictional changes following the introduction of maritime zones according to UNCLOS were analysed (Section 3: Table 3). Not all sectors would be greatly affected by the changes and consequently would not

contribute significantly to the change being analysed under the CBA. Those which emerge from the analysis as being most likely to be impacted are summarised in Table 6 where they are compared by an independent assessment carried out previously by the Expert Group report which, as in the present work considered initially the potential impacts on a wide array of sectors and activities.[217]

**Table 6 Maritime Activities most likely to be significantly affected by changes in maritime zones according to present legal analysis and previous assessment by Expert Group**

| | **Likelihood of impact by new maritime zones** | |
|---|---|---|
| **Activity** | **Present Study** | **Expert panel** |
| Vessel source pollution and environmental protection | Yes | Limited advantage |
| Fisheries | Yes | Significant advantage |
| Maritime surveillance and security | Limited | No comment |
| Conservation and MPAs | Yes - significant | Marine mammals – significant<br>Habitat protection – significant<br>Genetic resources - significant |
| Offshore renewable energy | No | Significant advantage |
| Marine scientific research | Yes | Significant. |

This shows that there is very close agreement between the two assessments. The present Study considers some limited impacts on maritime surveillance but only in relation to economic-based activities, given an EEZ relates to economic rights, such as fisheries and control of vessel-based pollution although some general principles are examined. The Expert Panel did consider offshore renewable to be significantly affected whereas our interpretation suggests this may be minimal. We are only aware of one example of a wind power project planned outside the territorial seas of the Mediterranean which enables some of the principles and implications to be examined. The activities in Table 1 represent those of the original 11 analysed for significant legal implications of an EEZ, or derivative zone, to be taken forward for further assessment (Table 3).

In addition, a number of overarching elements including sovereignty, Marine Spatial Planning (MSP) as well integrated surveillance and specific broad-based policy instruments (eg. Marine Strategy Framework Directive) also need to be assessed in relation to the jurisdictional changes brought by an EEZ (Section 10).

## 5.3 Categorisation of cost/benefit estimates

### 5.3.1 Quantitative approaches

As discussed above, the calculation of costs and benefits must be undertaken for each of the options and each scenario. The nature of the indicators of these costs and benefits are identified below. However, in terms of the activities which are considered to be most likely to show impacts as per Table 6, only fisheries and renewable offshore energy can be considered to be economic sectors with direct monetarised impacts. The remainder are activities which are often for the public good and which may have environmental, social or financial results. However, to obtain monetarised values to apply a cost benefit approach

[217] The Role of maritime zones in promoting effective governance for the protection of the Mediterranean marine environment.
http://ec.europa.eu/maritimeaffairs/pdf/mediterranean_expert_group_report_en.pdf

requires indirect valuations, or shadow prices, to provide those values. In such cases the environmental, social indicators then play a role in deriving these values as seen below.

The benefits of taking specific actions can be both quantitative and qualitative.

Firstly there are actual sectoral benefits – the specific monetary benefits from taking some action. These clearly are central to the direct benefits. They may be expressed as two types of benefit. The private benefits to coastal state industry of taking an action would include the opportunities for engaging in activity within a zone, compared to the opportunities granted to foreign industry. All economic benefits can be expressed, to the extent possible, in terms of overall turnover or gross value with value added, employment and employment multipliers where appropriate. Private company costs incurred in changes are a component of administrative costs.

Amongst potential indirect elements the social costs and benefits need to be considered. There are possibilities for doing this quantitatively. One method is to calculate the estimated value of ecosystem services, which for a conservation objective may be the production of an ecosystem under ideal conditions compared to the production under depleted conditions (the shadow value[218]). Here, production includes the value of renewable extractive potential plus other societal benefits, such as tourists and local communities benefiting which is particularly relevant in the case of eco-tourism to conservation areas such as participating in whale-watching or diving. Social costs may also be incurred by communities such as loss of traditional fishing rights when EEZs are declared. These too must be estimated by such indicators as change in employment or earnings.

Equally, environmental costs and benefits also part of the indirect type. As mentioned in relation to the social elements above these may need to be expressed in terms of changes in ecosystem services. A number of ways of doing this are available including for whole marine ecosystems (e.g. Jin et al 2003)[219]. Essentially, however, there is a taxonomy of values applied to environmental changes usually involving some direct or indirect way of monetarisation of the direct or indirect use value, as might be derived from tourism, for example or by estimating the value people will contribute indirectly through donations or grants to know a certain ecosystem exists or to try to preserve it for bequest to future generations. Hence people subscribe to WWF or related organisations in the anticipation that their contribution goes towards money for specific or meaningful conservation projects for the future. Some of this money goes to projects in the Mediterranean.

Change would clearly have a cost attached to it. On the face of it there is no legal impediment to declaring an EEZ, it would merely cost some (sometimes significant) administrative time to formulate and enact the legislation at national level. The reasons why a coastal State may not do this can be related to the point that it is easier to ratify a treaty than to fully implement and enforce it. This can lead to reasons as to why a State may be reluctant or unable to sign a treaty or claim a right which might include:

- Limited technical capacity to negotiate or implement/enforce a new zone;
- Limited financial capacity to negotiate or implement/enforce a new zone;
- Limited institutional capacity to negotiate or implement/enforce a new zone;
- Inadequate involvement of civil society;

[218] For fisheries, this is estimated as the size of the resource that produces the highest societal benefit, please see the EU COBECOS project for further details, e.g. https://cobecos.jrc.ec.europa.eu/c/document_library/get_file?p_l_id=1758&folderId=26421&name=DLFE-3532.doc

[219] Jin D. Hoagland P & Dalton T, 2003. Linking economic and ecological models for a marine system. Ecological Economics 46: 367-385.

- Institutional bottle-necks, i.e. complex or incoherent administrative and legal pathways horizontally and vertically;
- Low political priority.

In some sub-regions there are political complexities attendant on negotiating zonal boundaries or historical disputes. Such political problems are essentially outside of the scope of our analysis. As such, they, or, more correctly, their solution, carry an apparently high transaction cost which has to be balanced against the benefit of arriving at a solution. The inability to negotiate such boundaries, even in the relatively more simple case of continental shelf delimitation, suggests that the perceived benefits do not yet outweigh the political cost. Transaction costs are difficult to assess but may be estimated by assessing any losses accumulated through not having an agreement and counting this as a transaction costs. In the worst case, the transaction cost may be infinite where there is no political will or insuperable political divisions prevent any agreement from happening. In which case, no material benefit can outweigh this cost which is the limit of the cost benefit approach.

### 5.3.2 Qualitative evaluation

Although quantitative analysis of costs and benefits is important, and will to the extent possible be identified, the determination of a final cost-benefit equation also relies on the use of qualitative indicators and the weighting given to a particular outcome by correspondents. This is referred to in the interviews where respondents have the opportunity to raise key concerns about the current zonation with the review team. The objective of this is to see whether there are key concerns of a qualitative nature – for instance, about control over the development of offshore installations, particular conservation concerns, or insurmountable political difficulties (high transaction cost) – which transcend the monetary cost-benefit analysis and influence the final cost-benefit determination.

The qualitative approach has two purposes: to identify significant changes and the kinds of impact that will result as well as the direction of that factor (positive or negative) and to provide an assessment of impacts where quantification is impossible or not worthwhile. Where necessary, this exploration has been undertaken on the basis of objective data, but in many cases subjective expert-based evaluations have been used.

One important result from the interaction with stakeholders has been to assess whether any rights that might be gained from extending or creating zones would in fact be utilised, or whether the costs of doing so may be so high as to preclude usage.

Never the less since this is a cost benefit analysis every attempt has been made to valorise the selected indicators within simple conceptual models.

## 5.4 Analysis of costs and benefits.

### 5.4.1 Identification of an analytical framework

Each sub regional scenario analysis would include a number of country analyses. The scenarios have been identified and specified in Sections 5.2.1 and 7.2.2. The data has been collected in the desk study and in the interviews during the study. The costs and benefits in question are those likely to result from a change from a legislative and regulatory regime where coastal States have sovereignty over their territorial sea whilst leaving the remainder in the High Seas domain to a situation where all States claim their full EEZ thereby leaving no high seas in the Mediterranean as discussed elsewhere above. There are exceptions to this and it is possible to arrive at different options based on these variants but the simplest starting point is to compare these two ends of the spectrum, in other words, a direct

comparison of our Options 1 and 3 a move from territorial seas alone to a full EEZ. The relevant impacted sectors and activities have also been identified by the screening results in Table 6.

In this respect it is important to take into account the international or regional body which has a mandate to oversee a particular responsibility in the general responsibilities described by UNCLOS for high sea areas and estimate not only whether it has a mandate but also whether compliance by users is likely to be low or high, i.e. the practical expression of that mandate. This will be important in estimating any real gain in benefits when switching to State regulation under an EEZ.

There is then the task of giving a dimension to the identified costs and benefits. The costs and benefits may be economic, social or environmental. From the economic aspect most sectors can be monetarised including perhaps conservation through use of appropriate proxy indicators. This is less the case with social and environmental effects although employment or participation in benefits can act as a social measure but also, as a cost or revenue generation, can be linked to economic factors. Not all of such social and environmental changes can be so monetarised however.

Once the sectors have been identified the next task is the identification of cost benefit indicators which can be used to estimate the most probable magnitude of benefits, losses or costs. Where possible these should be numeric and quantitative. The use of indicators is particularly appropriate in the present analysis since, as mentioned above, this is not a purely economic cost benefits analysis as would be required as an investment guide but more an evaluative mechanism for testing the plusses and minuses of policy options

With an array of indicators identified and quantifiable as far as possible, we propose to use an analytical matrix which presents the indicators of change of economic, social and environmental costs and benefits when the States exert full rights over an EEZ compared to the situation when the States jurisdiction extends only to the territorial seas. Many of the costs can actually be a reduction in benefits rather than a direct increase in sectoral costs. For example, bringing the high seas fisheries into an EEZ may increase efficiency of management and possibly thereby, the catch but would have relatively little effect on the sectoral cost of making that catch. There may be many examples of indirect administrative costs increasing, however. The increased management of the high seas fishery will almost certainly require increased cost from the State for monitoring and scientific advice. The possibility of administrative benefits in terms of license fees, taxes and fines must also be considered.

Once the indictors have been identified and quantified they are used in an activity analytical matrix which is shown with some preliminary indicators are shown below. This has been assembled for three sectors although the actual analysis would clearly be conducted for all sectors and activities considered in Table 10 and this has been carried out in subsequent sections of this report.

To exemplify some of the considerations that need to be made, in the case of fisheries, all would be included in the EEZ for Option 3 but there may be a net loss of revenue from high seas fisheries which are now in neighbours EEZ and therefore may not be available. However, the exclusion of foreign fishers may increase the national catch whilst improved management can lead to stock recovery and increased production. All of these effects need to be estimated and integrated into net gains and benefits or net losses or increased costs. Social changes can be characterised in terms of gains or losses of employment particularly if there are losses of traditional high seas fishing rights. Wider environmental effects of fishing, as for example on the whole marine ecosystem, will probably be semi-quantitative in terms of whether the costs or benefits will be relatively high or low. Most of this data can be

extracted on a subregional basis from the Annual Economic Report (AER) or, to a lesser degree, from GFCM regional records. More discriminating data exists within the Member States programmes in support of the Data Collection Framework but this proved unavailable due to data protection.

Environmental effects of pollution from vessels may be higher in the high seas if pollution control measures are less rigorously applied but again only an indirect valuation would be possible. For example, the number of oil spill incidents with and without a protection zone can be used and, indeed, the risk may be monetarised by establishing what the liabilities were on these incidents and totalling them.

The third sectoral example included in the indicative table is Conservation including MPAs. No direct economic value can be put on this but some quantitative measure of status which reflects the level of current investment in Territorial seas and high seas conservation areas can be used, such as the area involved or the number of reserves included. For example, the results of surveys suggest that the establishment of the Pelagos Sanctuary produced an incremental direct economic benefit of some EUR 4million per year to the region. Of this a proportion was from the actual money paid by whale watchers/tourists to actually go out on vessels and see the whales. This can be termed the Direct Use Value and represents the value people place on actually seeing the protected whales. Thus it is a component of the value of conservation. Are there any other aspects of the value of conservation? There are, to the extent that the participating countries are prepared to pay for the maintenance of the sanctuary (Section 9.2), and also it receives grant from international organisations and NGOs which is derived from the money people will pay to know that such a conservation area exists and also the expectation that it will persist for future generations. This is a combination of the Indirect Use Value and the Bequest Value. A combination of these values does enable some semi-quantitative assessment of the value ascribed to conservation.

A further measure of the environmental benefits might be indicated by the biodiversity status of the regions as taken from the EEA biodiversity assessments (eg SEBI 2010). Possible increases in these might again be estimated from the results of the survey and the most likely new reserves.

The social impacts of conservation may be estimated from the number of tourists benefitting or, in the case of the Pelagos Sanctuary, from the numbers of coastal communities or operators benefitting from its presence (Section 9.2.4). So there are parameters that can be used to evaluate the relatively intangible element such as conservation and the experience of the Pelagos Sanctuary provides a useful model for assessing costs and benefits for this sector.

Finally, in addition to the specific sectoral effects there are two overarching sources of costs or benefits. Firstly there are the transaction costs, the costs of negotiating the boundaries of any extended zones with neighbours (Section 13.1). The second is the value added by the integrated approach to maritime resource incorporated into the Integrated Maritime Policy including marine spatial planning (MSP) and the Marine Strategy Framework Directive. Some overall assessment of implications on these broad-based instruments of these will be made (Section 12). Finally, there are the implications of sovereignty, which can also be considered.

### 5.4.2 The specific method for the Cost Benefit Analysis

The analysis is centred around the Evaluation Matrix shown in Table 8 (Case of single indicator of economic benefit in fisheries). This can be used to test the three options identified above, ie: no zones beyond territorial seas; with EEZs; with derivative zones (FPZ, EPZ, EFPZ) in relation to costs and benefits by scenario and activity.

The matrix is applied to those six sectors and activities which are deduced from UNCLOS to be most likely affected by extension of Mediterranean maritime zones as summarised in Table 7 in relation to our Legal Analysis (Section 3) and also that of the Expert Group report.

**Table 7 Example of analytical framework by sector for estimates or indicators of costs and benefits at present when state regulation is mainly confined to territorial seas (Option 1) and situation if this extended into high seas areas under full EEZ (Option 3).**

Δ = change in speculative gains and losses are indicated as +ve , probable gains or –ve, probable losses, although practical application would try to quantify these as far as possible.

| | | Economic | | | Social | | | Environmental | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sector** | **Regulated by:** | **No EEZ** | **With EEZ** | **Net gain/loss** | **No EEZ** | **With EEZ** | **Net gain/loss** | **No EEZ** | **With EEZ** | **Net gain/loss** |
| **Fisheries** | **State** | Value/volume catch | value /volume catch | (-ve) | Number/% employment | Gain in employment | (+ve?) | Ecosystem effects | Δ ecosystem effects | nil? |
| | **International High seas** | Value/volume catch | Δ value/volume catch (nil?) | (-ve?) | Number /% employment | | (-ve?) | Ecosystem effects | Effects now State regulated | (+ve?) |
| **Vessel pollution** | **State** | Value (gross/net) | Δ control costs Δ costs (eg. oil discharge cost) | nil? | Dependent tourism | Δ in tourists | (nil) | value to State of clean seas | Lower Value to State of clean seas | Nil |
| | **International High seas** | | | (+ve) | Average wage | Improved conditions of service and wage | (+ve) | Medium (pollution) | | (+ve) |
| **Conservation / MPAs** | **State** | Area/number | Probable Δ in area /number | (+ve?) | Perceived public value | perceived value, | | Biodiversity status | Δ status of biodiversity | |
| | **International High seas** | Area/number | Probable Δ in area/number | (+ve?) | Perceived public value | Δ perceived value via tourism | (+ve?) | Biodiversity status | Δ status of biodiversity | (+ve) |
| | | | | | | | | | | |
| ***Remaining Sectors.....*** | | | | | | | | | | |
| | | | | | | | | | | |
| ***Overall Δ Costs & benefits*** | | | | *(Summary / Total)* | | | *(Summary / Total)* | | | *(Summary / Total)* |

### 5.4.3 Use of Evaluation Matrix

In order to explain clearly how the matrix works to test the three options a simple example has been prepared below (Table 8). Bearing in mind we need to assess monetarised costs and benefits, the simplest example is to take one sector, fisheries, one field of costs and benefits, Economic, and one indicator, here a benefit indictor, the value of catch:

**Table 8 Case of single indicator of economic benefit in fisheries (extract from main matrix)**

| | | | | Economic |
|---|---|---|---|---|
| **Sector** | **Regulation by** | **Value with no EEZ** | **Value with EEZ (TS+HS)** | **Net gain/loss** |
| **Fisheries** | **State** | catch value in TS = a | Catch value = a+b | |
| | **International High seas** | Catch value in HS = b+c | catch (nil?) | |
| ***Total value*** | | a+b+c | a+b+d | d - c |

*Where for each State: a = catch value from Territorial Sea (TS); b = present value from high seas which could be EEZ; c = value from HS outside potential EEZ;*
*d = value of catch previously taken by foreign vessels in what is now in the State's EEZ.*

This shows that, in fact, the change in economic benefit as a result of claiming an EEZ is the change in value of catch taken from high seas areas before and after, assuming that other countries have also claimed their EEZs and have prohibited other States' vessels. This is the simplest, black and white test case, we can alter the assumptions to accommodate, for example, reciprocal rights on specific stocks if we have the data but this demonstrates the simplest case to start with.

It demonstrates specifically that changes are largely concerning those in potential EEZ areas so there may not always be necessary to give details of Territorial Seas or baselines if changes can otherwise be derived. In other words, it is **the incremental change** from 'no zones' to 'with zones' that is important.

The net changes in all monetarised indicators can be totalled at the end to give the total net cost or benefit to the State in question (final line in Table 7).

The next task is to select cost and benefit indicators for each field for each sector of activity and to apply the above approach. These indicators can be taken from both public or private sectors.

## 5.5 Identification and typology of Indicators.

Based on the data collected from the desk research and interviews and the understanding of the status of the sectors included the following possible indicators were proposed for use in the matrix (Table 7). Each was investigated to determine the possibility of evaluation to produce the monetarised values to put into the final cost benefit analysis and those which were practicable were finally used. The preliminary list of indicators below was refined in the course of the analyses.

**1. Fisheries**

**Economic**

*Benefit indicators:*

1. first sale value of catches
2. Catch volume
3. Multiplier values to industry or value added

*Cost indicators:*

1. Cost of fisheries control
2. Data collection/monitoring

**Social** (only one array of indicators which are benefits if positive or costs if negative)

1. Employment numbers/FTEs
2. Gross Value Added/job
3. Number of communities dependent on fishing

**Environmental** (only one array of indicators which are benefits if positive or costs if negative)

*Stock conservation status*

1. Compliance with regulations.
2. Incremental population growth in key stocks if managed towards MSY as per CFP reform.

*Ecosystem effects*

1. Trend in Marine Trophic Index (available as indicator under SEBI 2010 process under Habitats Directive).
2. Fisheries in Balance Index (Pauly et al 1998)

**2. Conservation**

Is related to the creation of new maritime zones in the form of open sea Marine Protected Areas (MPAs)

**Economic**

*Benefit indicators:*

1. Direct MPA revenues (tickets/taxes/budget)
2. Multiplier revenues (ie. services to visitors)
3. Increased research/investment funds
4. Patents based on genetic conservation

*Cost indicators:*

1. Costs of MPAs (start-up and operational).
2. Costs of control and enforcement (including Pollution control re MARPOL 73/78)
3. Costs of monitoring (eg. marine implementation of Marine Strategy Framework and Habitats/Birds directives

**Social**

1. Number of people benefitting (tourists/operators)
2. Number/population, of communities benefitting (eg. Pelagos Sanctuary data).

**Environmental**

1. Change in number/area of zones under protection.
2. Value of ecosystem services assured through conservation
3. Change in value people put on knowing area is protected (likely contributions from public and private sources eg. UNEP, IUCN, members of ACCOBAMS etc).

In fact for MPAs this component only become relevant if there are plans to instigate MPAs in what are currently High Seas areas, such as the Pelagos Sanctuary. Conventional MPAs are all in Territorial Seas and thus status will not change.

**3. Environmental Protection**

All indicators here are, by definition, relate to environment but have indirect social (tourist beneficiaries) and economic (sub-sector of tourism protected by pollution control).

1. Change in value of damage to marine environment from vessel based pollution discharge
2. Value of clean seas to State as indicated by commitment (deterrent fines etc)
3 Cost or benefit from tourism assured by control of vessel-based pollution
5 Change in costs of control and enforcement
6. Change in pollution incidents before and after protection.

**4. Research**

**Economic**

*Benefit Indicators*

1. Probable change in numbers or funding of research projects in changed zones from examination of existing cases although change from high seas to EEZs will not produce any new researchable opportunities it's just who posseses them which changes.

*Cost Indicators*

1. May actually be represented by an effective loss of budget if State tries to accomplish research in new EEZ without extending budget from existing territorial seas.
2. Opportunity costs of loss of access to other countries new EEZs in relation to the States present commitment to high sea research.

**Environmental**

1. Probable change in donations from international sources, public and private institutions and NGOs (eg. WWF, IUCN) into research in the environmental/conservation area to show value people put onto environmental research.

**5. Offshore renewable energy**

There is a difference of opinion between this study and that of the Expert Group. Based on the legal analysis here, since structures are anchored, they are covered by the existing positions on the automatic right to the continental shelf aspect of an EEZ and will therefore be covered by existing rights.

In practical terms this is unlikely to be a significant element in any analysis. The very limited tidal range means that tidal power is not an option in the Mediterranean. Consultation with the EWEA indicated that there are no plans or targets for the siting of wind power structures outside territorial seas although one such plan has emerged off southern Italy from the

4Winds project to build wind farms on shallow banks on the underwater limestone ridge between Sicily and Italy that separates east and western basins[220].

**6. Overarching costs and benefits**

There are two elements which will need to be taken into account on a cross sectoral basis. Firstly the transaction costs, which will require seem?? estimate of the amount of time and therefore cost the negotiations between neighbours is likely to take in order to establish the EEZs. Enquires along these lines have been included in the interview questions.

A further cross sectoral element is Maritime Spatial Planning. This would be expected to improve benefits of the whole maritime zone due to a more integrated approach to the sectors. Some general assessment of this has been made during the development of the concept in DG MARE[221] (DG MARE 2010) and this will be used to try to include its benefits within the present scenarios.

## 5.6 Application to sub-regional case studies

The analysis is done on a sub regional basis in a way that offered a model of an all Member States case, a mixed Member State and non-Member State case and one involving a southern State. The scenarios given in Table 4 and Section 5.2 have been used taking into account the availability of data and the spectrum of issues which need to be examined.

When the evaluation matrices are completed for each constituent country of the three scenarios then they can be put together with those of the other countries in the scenario to achieve an overall assessment for each of the options. For each scenario an assessment of the total overarching costs or benefits derived from an estimate of the transaction cost being the estimated amount of time needed for negotiation of the EEZ with neighbouring States

In assessing the completed evaluation matrix for each constituent country in these scenarios as per Table 7, totalling or assessing the net changes by sector will gives an evaluation of the net change in costs and benefits between the 'no zones' Option 1 and a full extension to EEZs as per Option 3 as per Section 13.5.

To test the effects of a restricted sectoral protection zone for the country, such as a Fisheries Protection Zone, then the net changes are given simply by the assessment for that sector in the matrix as per Sections 13.2, 13.3 and 13.4.

## 5.7 Summary of methodology

To briefly summarise the approach:

- A cost benefit analysis implies gains and losses need to be monetarised as far as possible for a final quantified look at gains and losses from claiming EEZs or other zones.
- Of the sectors only fisheries and offshore renewables are direct economic activities therefore for other indicators are selected for which some valuation or 'shadow prices' can be derived related to the value of services they provide.
- The scenarios need to be tested with and without the zones in question which means setting up simple conceptual models based on the legal analyses within which the

[220] http://www.4wind.it/
[221] http://ec.europa.eu/maritimeaffairs/study_msp_en.html

valorised indicators can be used to explore changes in costs and benefits from the 'with' and 'without' derivative zones and ultimately EEZs.

- These scenario models are populated with indicator values by sector and analysed for each country within the scenarios with summaries for each scenario.
- Where a fully quantitative appraisal is not possible or meaningful a qualitative or semi-quantitative assessment has been carried out.
- Finally the monetarised costs and benefits for all the sectors and presence or absence of derivative zones, the scenarios will be brought together in a synthesis to conclude under what conditions changes to maritime zones will overall, as EEZs, be beneficial or not (Section 13).
- Some significant overarching considerations will be brought to bear which may modify or override the purely quantitative outcome.

# 6 Costs benefit model - fisheries[222]

## 6.1 Methodology for fisheries sector model

In order to estimate the costs and benefits accruing to each State in the three case studies a standardised methodology was adopted.

The total catch is taken from the GFCM database by region for the three scenario areas concerned for a single year 2008. These data are probably the best single aggregated set of catch data for the scenario areas as outlined in Section 5.4.2. Only species that represent greater than 1% of the total catch are used, with all other species being grouped together are marine fish nei (not elsewhere included). The first stage of the analysis process estimates the proportion of the total catch made by each flag State in the scenario area. These proportions are estimated based on the distribution of the individual species in the scenario area as the zones of the States concerned may not fully coincide with the area of the scenario. As such only part of the catch should be allocated to the model scenario catch.

The proportions of the catch of each species taken by each flag State in the four possible zone classes are defined as below;

(i) its own territorial sea;
(ii) its own theoretical EEZ;
(iii) in the EEZs of other EU Member States; and
(iv) in the EEZs of non-EU Member States).

These proportions are estimated using a variety of information sources as no single source has the information required to define the proportions. These information sources on the fish and fisheries concerned include:

- scientific peer-reviewed papers;
- grey literature;
- national and regional reports;
- records of distribution in www.fishbase.org; and
- expert knowledge of the fish species and fisheries.

For example fish that are usually found in depths of less than 100m (e.g. bogue (*Boops boops*) are likely to be found exclusively in the territorial seas but pelagic species such as dorado (*Coryphaena hippurus*) are likely to be found further offshore in the EEZs and maritime zones of coastal States.

The GCFM does not collect data on the Bluefin tuna (BFT) catches. To include regional estimates of BFT the records of ICCAT have been employed. These, however, are only loosely disaggregated into what are quite large regions. To provide estimates of catches for particular countries and regional scenarios we have used assessments based on fleet activity and the sources listed above in order that they can be included in the scenarios.

The recorded catch for each species in each State is then multiplied by the proportions in each zone to give an estimate of the catch of each species in each of the zones. An

[222] *This model was prepared prior to the claims by France and Spain for full EEZs and does not take into account the impacts of such claims.*

estimate of the total catch by zone can then be calculated, as well as the potential gains or losses in terms of catch that would be taken in a States' waters (i.e. territorial sea, maritime zone and EEZ combined), other Member State EEZs, or in non-Member State EEZs. These can be seen in Table 9, Table 10 and Table 11 for the Gulf of Lions, Straits of Sicily and Adriatic scenarios respectively.

Price information is also collected for each of the species and State combinations. This price information is estimated from a variety of sources including;

- Commercial fish price literature (e.g. Infofish and Globefish European Fish Price Reports);
- Eurostat;
- Grey literature;
- National and regional reports.

Price estimates throughout are the first landing price of the fish. Where prices are quoted in currencies other than Euros they are converted into Euros at this stage. Where possible price averages for the specific country, species and year are used, but in the absence of these data estimates are used based on the same species in other neighbouring countries or in other years.

The recorded catch for each species and zone in each State is then multiplied by the estimated price to give an estimate of the total first landing value of each species in each of the zones. Similar to catch above an estimate of the total value by zone can then be calculated and the potential gains and losses in terms of catch that would be taken in their own zone, other Member State EEZs, or in non-Member State EEZs. These can be seen in Table 9, Table 10 and Table 11 for the Gulf of Lions, Straits of Sicily and Adriatic scenarios respectively.

A summary flow diagram of the methodology can be found in Figure 11.

In the analysis the following estimates are presented for each State in each Scenario;

- Current Catch (t/€) – The current tonnage and value of the catch taken by a State in the Mediterranean.
- Catch Opportunities Protected (t/€) – The tonnage and value of catch that would be protected if EEZs were declared (i.e. the catch from a State's own territorial waters, maritime zone and exclusive economic zone).
- Catch Opportunities Protected Other MS (t/€) – The added amount and value of catch that could additionally be protected and available to an EU Member State if EEZs were declared and fishing opportunities in other Member State waters retained at the current levels (i.e. the catch value from the exclusive economic zones of other EU Member States).
- Catch Opportunities Lost (t/€) – The amount and value of catches that are currently taken in the EEZs of non-EU Member State waters that would not be available for capture without agreement between States.
- Catch Opportunities Gained (t/€) – The amount of catch and the value of catches that are currently taken by non-EU Member States that would not in the future be allowed without agreement between States. These catches could in theory be exploited by the State of other EU Member States.

- Projected Catch (t/€) – The total amount and value of projected catches if EEZs were declared.
- Net Gain / Loss (t/€) – The net gain or loss in tonnage and value.
- Net Gain / Loss (% – The net gain or loss of tonnage and the financial gain or loss as a percentage of the current catch and catch value.

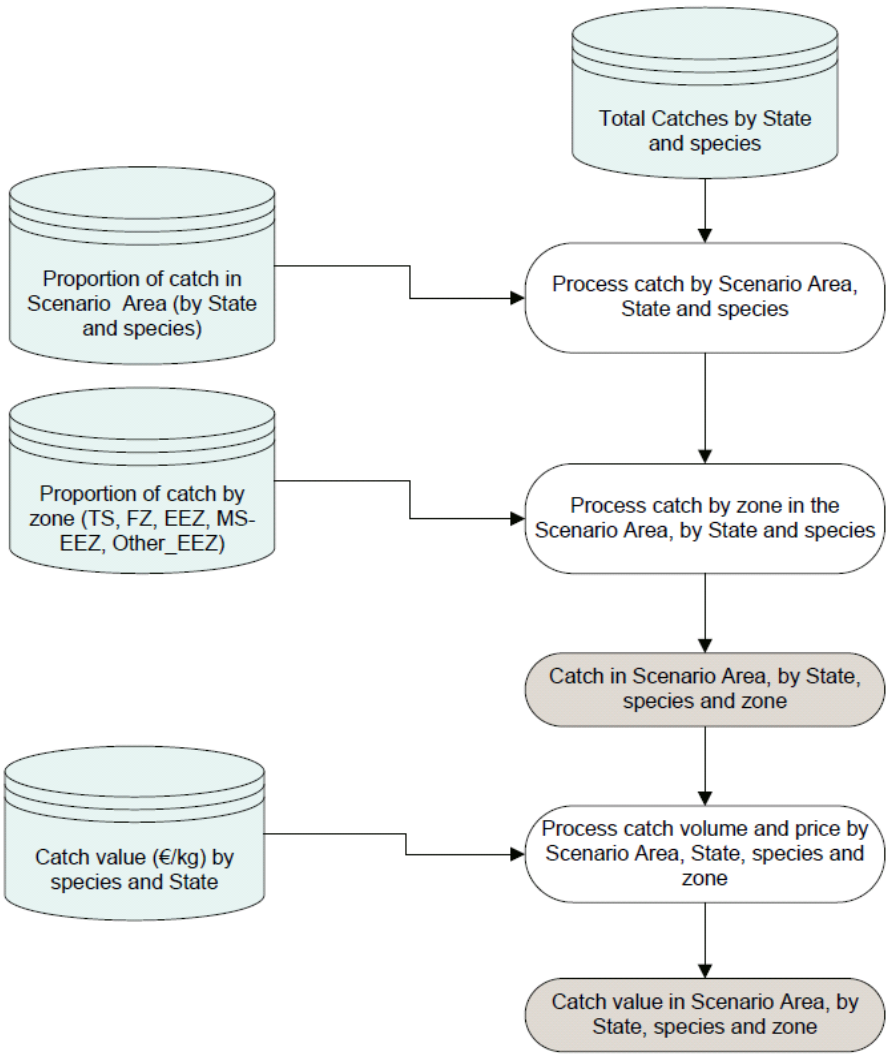



**Figure 11 Fisheries sector analysis methodology flow diagram**

As discussed in Section 3.4.3 an EEZ would have the same status with respect to fisheries and a derivative FPZ As such the following analysis informs the Options 2 and 3 of the analysis as described in Section 5.1.

To provide Option 1, the no zones option where there are FPZs in place, eg. Spain and Croatia, this is simulated by assuming that all the agreements which have been already put in place with neighbours do not yet exist and that in claiming a zone the country in question has the right to exclude all its neighbours and take up their portion of the catch themselves as a benefit. The losses attributed to the neighbours then represent the opportunity cost that the neighbour countries must overcome by negotiating agreements. In fact the practical effectiveness of FPZs in the Mediterranean is very variable. Croatia, for example, has waived the exclusion to EU vessels in the Adriatic and these are the most numerous of foreign vessels operating within the Croatia EFPZ.

Slovenia and Bosnia Herzegovina are omitted for the reasons given in Section 5.2.2.

## 6.2 Changes in Catch Benefits

The model is aimed at giving a value to fishing access rights which will be gained from what is now the high seas and those that will be lost as other coastal states acquire those access rights in their own EEZs. Using the returns from the appropriate GFCM areas the catches of the scenario countries and their relative values which would remain within the EEZ/FPZ are identified as 'Catch opportunities protected' in the following tables alongside 'Current catches'. Those present catch opportunities which would find themselves in the EEZ/FPZ of another member State and therefore under traditional fishing rights of the CFP might still be available to that Member State are identified as 'Catch opportunities protected by other Member States'. Other gains and losses States are labelled appropriately. The changes in fishing opportunities are then combined to give a projected catch under the new circumstances of States claiming their fishing zones from which net gains are extrapolated.
These components have been estimated for each country by scenario in terms of both tonnage and value from data collected in studies (Table 9, Table 10 and Table 11).

**Table 9 Summary of Gulf of Lions catch changes**

| | France | Spain |
|---|---|---|
| **Current Catch (€)** | **39,403,197** | **449,467** |
| **Catch Opportunities Protected (€)** | **36,830,881** | **358,276** |
| **Catch Opportunities Protected Other MS (€)** | **2,572,315** | **91,192** |
| **Catch Opportunities Lost (€)** | **0** | **0** |
| **Catch Opportunities Gained (€)** | **0** | **0** |
| **Projected Catch (€)** | **39,403,197** | **449,467** |
| **Net Gain / Loss (€)** | **0** | **0** |
| **Net Gain / Loss (%)** | **0%** | **0%** |

| | France | Spain |
|---|---|---|
| **Current Catch (t)** | **18,180.00** | **43.00** |
| **Catch Opportunities Protected (t)** | **17,445.10** | **37.65** |
| **Catch Opportunities Protected Other MS (t)** | **734.90** | **5.35** |
| **Catch Opportunities Lost (t)** | **-** | **-** |
| **Catch Opportunities Gained (t)** | **-** | **-** |
| **Projected Catch (t)** | **18,180.00** | **43.00** |
| **Net Gain / Loss (t)** | **-** | **-** |
| **Net Gain / Loss (%)** | **0.00%** | **0.00%** |

## Table 10 Summary of change in catches in Adriatic scenario

| | Croatia | Italy | Montenegro | Albania |
|---|---|---|---|---|
| **Current Catch (€)** | 103,150,458 | 340,860,686 | 1,589,273 | 14,276,844 |
| **Catch Opportunities Protected (€)** | 77,721,469 | 283,791,780 | 1,392,291 | 11,899,005 |
| **Catch Opportunities Protected Other MS (€)** | | | | |
| **Cacth Opportunities Lost (€)** | 25,428,989 | 57,068,907 | 196,982 | 2,377,840 |
| **Catch Opportunities Gained (€)** | 57,251,465 | 26,668,861 | 1,841,057 | 279,020 |
| **Projected Catch (€)** | 134,972,935 | 310,460,640 | 3,233,348 | 12,178,025 |
| **Net Gain / Loss (€)** | 31,822,476 | -30,400,046 | 1,644,076 | -2,098,819 |
| **Net Gain / Loss (%)** | 30.85% | -8.92% | 103.45% | -14.70% |

| | Croatia | Italy | Montenegro | Albania |
|---|---|---|---|---|
| **Current Catch (t)** | **48,150.00** | **96,311.50** | **452.00** | **3,320.00** |
| **Catch Opportunities Protected (t)** | 36,427.60 | 79,547.09 | 367.45 | 3,011.10 |
| **Catch Opportunities Protected Other MS (t)** | - | - | - | - |
| **Catch Opportunities Lost (t)** | 11,722.40 | 16,764.41 | 84.55 | 308.90 |
| **Catch Opportunities Gained (t)** | 16,745.36 | 11,899.25 | 544.35 | 194.08 |
| **Projected Catch (t)** | 53,172.96 | 91,446.34 | 911.80 | 3,205.18 |
| **Net Gain / Loss (t)** | 5,022.96 | -4,865.16 | 459.80 | -114.82 |
| **Net Gain / Loss (%)** | 10.43% | -5.05% | 101.73% | -3.46% |

## Table 11 Summary of changes in catches in Straits of Sicily/Malta scenario

| | Malta | Tunisia | Italy |
|---|---|---|---|
| **Current Catch (€)** | € 5,851,444 | € 91,810,336 | € 358,741,807 |
| **Catch Opportunities Protected (€)** | € 4,273,947 | € 87,175,335 | € 287,623,371 |
| **Catch Opportunities Protected Other MS (€)** | € 403,653 | € - | € 52,665,016 |
| **Catch Opportunities Lost (€)** | € 1,173,845 | € 4,635,001 | € 18,453,421 |
| **Catch Opportunities Gained (€)** | € 2,317,501 | € 19,627,265 | € 2,317,501 |
| **Projected Catch (€)** | € 6,995,100 | € 106,802,600 | € 342,605,887 |
| **Net Gain / Loss (€)** | € 1,143,656 | € 14,992,264 | -€ 16,135,920 |
| **Net Gain / Loss (%)** | 19.54% | 16.33% | -4.50% |

| | Malta | Tunisia | Italy |
|---|---|---|---|
| **Current Catch (t)** | 1159.49 | 71132.25 | 80782.95 |
| **Catch Opportunities Protected (t)** | 913.88 | 68443.00 | 71031.64 |
| **Catch Opportunities Protected Other MS (t)** | 70.77 | 0.00 | 5222.12 |
| **Catch Opportunities Lost (t)** | 174.85 | 2689.26 | 4529.19 |
| **Catch Opportunities Gained (t)** | 1706.29 | 4704.03 | 982.96 |
| **Projected Catch (t)** | 2690.93 | 73147.03 | 77236.72 |
| **Net Gain / Loss (t)** | 1531.45 | 2014.78 | -3546.23 |
| **Net Gain / Loss (%)** | 132% | 3% | -4% |

The landed value of the change in current and projected catches is taken as a monetary value on the changes in fishing opportunities offered by the change in fishing access rights which would occur upon declaration of an EEZ. In the tables a change within plus or minus 5% is shown as amber, a gain of more than 5% in green and a loss of more than 5% in red (Table 9, Table 10 and Table 11). In the tables above the Member States have been treated as EU entities who are protecting the traditional rights of other Member States to have continued access to rights now in their waters, hence there is no net change in the France/Spain scenario as they are treated as having reciprocal rights. The situations as Member States as both EU entities and as separate entities are considered further below. It should also be noted that in the France/Spain Gulf of Lions scenario only a small proportion of the Spanish fishery appears in the GFCM zone from which the data is taken but it still demonstrates the principle.

## 6.3 Changes in the costs of fisheries control and data collection

In the previous section we have documented the potential changes in benefits from fishing but an increase in jurisdiction to EEZs with its change in 'ownership' of access rights also brings increased responsibility for proper management of the stocks. There are two main aspects of costs attached to this increased responsibility, the first is the need to collect more data on those stocks now in the nations stewardship and the second is the need for control of the fleets and their catches in line with the management plan formed from the data collected.

### 6.3.1 Costs of data collection

It can be difficult to assess the costs from all the elements of data collection towards fisheries management but fortunately the European Commission keep records of the annual costs of Member States in providing the data required from them in conformance with the Data Collection Framework (DCF) which superseded the earlier Data Collection Regulation (DCR) in 2008 under the Common Fisheries Policy. This prescribes a standardised list of data to be collected which can be regarded as the minimum required that allows the stocks to be managed according to the best available scientific information. In the Atlantic countries the data allows ICES to help formulate management plans and to run the stock models underpinning quota decisions. In the Mediterranean the data is provided to the GCFM but there is not the same predictive requirement since annual quotas are the exception. The costs of funding the collection of such a standardised list of basic data therefore provide a good baseline for overall estimation.

Within the EU Member States, however, much of the funds for data collection are spent in their territorial seas. This is necessarily the case because many of the small scale fisheries are conducted in the inshore zone and also the bottom dwelling fish, an important part of the catch, are restricted to the narrow continental shelf which lies mainly within those seas. The one exception to this is the data collection on the open water bluefin tuna. The costs included however, are only the scientific component since the observer scheme, which now contributes some data, is part of control costs. The science costs for bluefin are not a major factor in the whole data collection budget.

The essential inshore nature of the data collection costs, in which generally a major expense is at-sea surveys, is demonstrated by the International Mediterranean Trawl Survey (MEDITS; Figure 12). The MEDITS programme[223] carries out trawl surveys in a standardised

[223] http://www.sibm.it/SITO%20MEDITS/principaleprogramme.htm

fashion by international partners. Many are EU Member States but there is also collaboration from Croatia, Albania, Montenegro and some southern States such as Morocco and Tunisia. Much of the activity is within the territorial seas although there some transects in high seas areas notably in the Adriatic (although Croatia does have its EFPZ there). Within Member States the costs of MEDITS is included in the funding of the DCF. The tendency to allocate most of the funds to work in the territorial seas was confirmed in interviews with fisheries scientists of the coastal States.

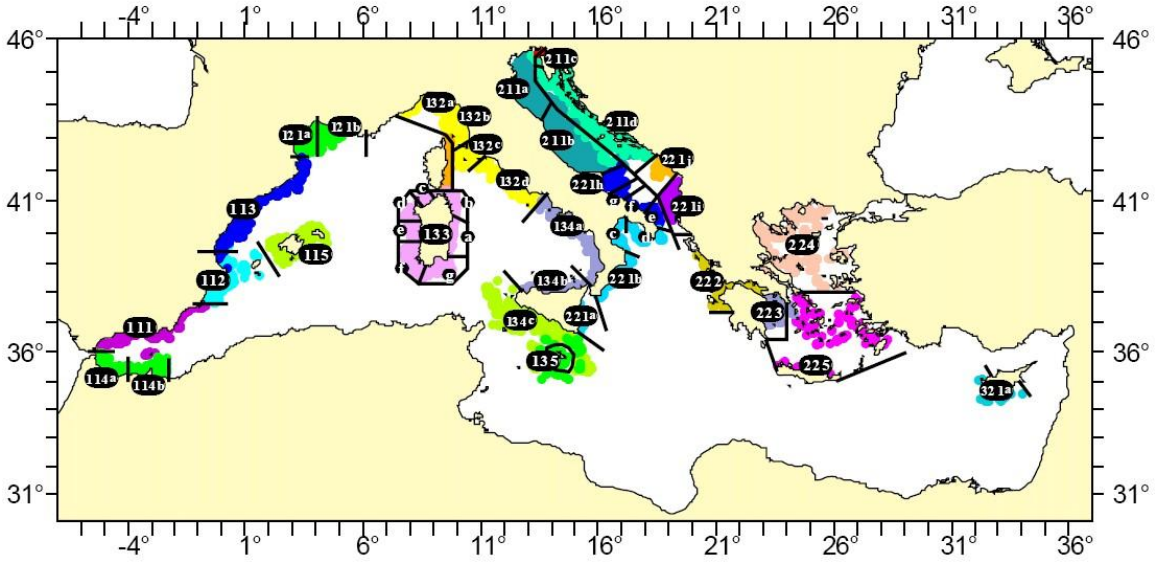



**Figure 12 Areas of activity of the International Mediterranean Trawl Programme (MEDITS). Areas of activity are shown in colour and regular annual trawl transects are indicated by black lines**

With this in mind the costs for Member States can be taken from the DCF records and related to the area of the territorial sea to obtain an index of cost per square kilometre for fisheries data collection (Table 7). This can be used to extrapolate to the area of the EEZ to give an incremental cost of extending the responsibilities to this area. The original total costs for France and Spain have been divided between the Atlantic and Mediterranean in relation to their respective catches in these regions since this is not recorded separately.

There remains the issue of providing cost indicators for non Member States. In the Adriatic the means for marine monitoring and research available to Croatia in relation to the area of its potential EEZ seem relatively equivalent to those on the Adriatic coast of Italy (Section 8.6) therefore we propose to use the same cost per square kilometre in Table 12. This would be the cost of Croatia within its EFPZ, which it has already claimed, if it were done to EU standard. The position of Tunisia is similar. Montenegro and Albania have relatively limited capacities and no mean for open sea research (see Section 8.6) their relative needs may be equivalent to those of Croatia and Italy but it would probably be more realistic to use a lower estimate hence that for Greece is used. The relative costs are summarised in Table 14.

The unit data collection costs for Spain cannot be taken as just for the territorial sea since Spain administers its FPZ. The data cost per km2 must therefore be divided by the total area of the territorial sea and the EEZ, ie FPZ in this case. In a similar way, Malta should be deploying its data collection effort over its 25nm fishery zone rather than just its territorial sea and has thus been treated in a similar fashion.

The next question the extent to which an indicator based on data collection in the territorial seas can be used to represent the costs required for data collection beyond. There are

significant stocks in the open sea areas. A recent analysis indicated that the pelagic open water ecosystem provided 74% of the benefits from Mediterranean fisheries from a third of the species (Plan Bleu 2010) whilst amongst the stocks listed to be sampled under the DCF of the EU in the Mediterranean include 33% pelagic stocks of the 45 listed. There exists, therefore a measure of responsibility for stewardship of the resources that fall under the extended jurisdiction exists in the open water areas most of which are pelagic. Such open sea monitoring also requires expensive means such as larger vessels to carry out the sampling.

**Table 12 The relative costs of fisheries data collection in relation to the area of the territorial seas extrapolated to potential EEZs**

| Country | TS km2 | Data Cost | cost/TS km2 | Cost /EEZkm2 | EEZ km2 | ∆ EEZ cost |
|---|---|---|---|---|---|---|
| Spain | 55196 | 3,297,030* | | 16.3† | 147020 | 2,396,426 |
| France | 24467 | 1,578,862* | 65 | 32.5 | 53535 | 1,739,887 |
| Italy | 154578 | 4,272,453 | 28 | 14 | 383550 | 10,739,400 |
| Croatia | 31510 | | 28 | 14 | 23848 | 333,872 |
| Montenegro | 2320 | | 17 | 8.5 | 4093 | 34,790 |
| Albania | 6106 | | 17 | 8.5 | 5098 | 43,333 |
| Greece | 114000 | 1,890,488 | 17 | 8.5 | 38770 | 329,545 |
| Cyprus | 13557 | 524,938 | 39 | 19.5 | 82050 | 1,599,975 |
| Malta | 3990 7547(FZ) | 485,000 | 62 | 42 | 44020 | 1,848,840 |
| Tunisia | 36880 | | 28 | 14 | 41860 | 586,040 |
| TOTAL | 479,719 | | | 19.6 | 823,844 | 19,652,108 |

*Where TS = Territorial Sea; EEZ = potential Exclusive Economic Zone; Data cost is the annual budget in EUR for those States returned to DG MARE for 2008. * Equivalent to 41% of country total for Spain and 20% for France. Values in red are derived from comparable EU States as per the text. Assume EEZ costs 50% of TS costs with no benthic fishery (see text). †Data cost spread over TS and EEZ since Spain administers and FPZ. FZ is area of Malta Fishing Zone*

Never the less, whilst monitoring in the territorial sea includes both pelagic and demersal stocks, the incremental monitoring within the EEZ could be seen as largely pelagic. On this basis the cost indicator for this incremental monitoring can be put at 50% of that for the territorial sea of the particular coastal State. Applying this within the model gives the incremental data collection costs within the new EEZs shown in Table 12.

### 6.3.2 Cost of fisheries control

A similar approach can be adopted to provide costs indicators for control as has been done above for data collection since the European Commission also records the budget for control measures as required by the Control Regulation with the CFP. The budget contains both the contributions from the EU together with that of the Member State. Thus for Member States the recorded expenditure for control under the Control Regulation is taken as their costs which can then be related to the area of the territorial sea on the assumption that most sea borne control is within the TS since, apart from anything else, inspectors have no right to inspect third country fishing vessels on the high seas (Bluefin tuna is a special case). Indicative cost indicators of control in EUR/km2 can be derived in this way (Table 13). An exception to this is Spain with its FPZ thus the unit control costs must be estimated over the

total area of territorial sea plus EEZ/FPZ. Similarly, Malta presumably deploys its control over its total 25nm fishery zone and thus the relative unit costs are estimated on this basis.

**Table 13 The relative costs of fisheries control in relation to the area of the territorial seas extrapolated to potential EEZs**

| Country | TS km2 | Control Cost (EUR million) | cost/TS km2 | Cost /EEZkm2 | EEZ km2 | ∆ EEZ cost |
|---|---|---|---|---|---|---|
| Spain | 55196 | 11.53 * | 89 | 57.6 | 147020 | 8,468,352 |
| France | 24467 | 0.72 * | 29 | 17 | | |
| France (derived)† | 24467 | 2.97 | 121 | 76 | 53535 | 3,908,055 |
| Italy | 154578 | 24.9 | 161 | 97 | 383550 | 37,204,350 |
| Croatia | 31510 | | 151 | 91 | 23848 | 2,170,168 |
| Montenegro | 2320 | | 151 | 91 | 4093 | 372,463 |
| Albania | 6106 | | 151 | 91 | 5098 | 463,918 |
| Greece | 114000 | 19.37 | 170 | 102 | 38770 | 3,954,540 |
| Cyprus | 13557 | 0.85 | 63 | 38 | 82050 | 3,117,900 |
| Malta | 39907547 | 1.00 | 129 | 86.7 | 44020 | 3,815,550 |
| Tunisia | 36880 | | 151 | 91 | 41860 | 3,809,260 |
| TOTAL | 479,719 | | | 97.1 | 823,844 | 67,284,556 |

*Where TS = Territorial Sea; EEZ = potential Exclusive Economic Zone; Data cost is the annual budget in EUR for those States returned to DG MARE for 2008. † current estimate for France clearly incomplete so derived as per text; * equivalent to 41% of country total for Spain and 20% for France. Values in red are derived from comparable EU States as per the text*

There is an additional control cost for Bluefin tuna which amounts currently to around EUR 1.8 million per year on an international observer programme under ICCAT regulations. This is a cost borne by the industry. However, in 2008 there was only a national observer programme which, for EU Member States, was largely covered by the budget for the Control Regulation, which is the basis for the above cost indicators, and thus would include this BFT observer element.

The relative costs for France in Table 13, however, appear unduly low. Since France is not currently known for its lack of attention to fisheries control there must be some anomaly in recording the funding. A Member State may contribute unilaterally to control costs without recourse to the Commission and the current record for France looks incomplete. To obtain a viable estimate for France, rather than use the current cost from DG MARE which cannot be representative, a previous estimate of their control costs suggested it to be EUR13.5million for the whole country (MRAG 2004) can be used. Allocating 20% of this to the Mediterranean as before on a fishery basis brings it to EUR2.7million. This can be increased by 10%, to EUR2.97, to account for inflation since 2004. If this is then related to Territorial Sea area it gives a more representative cost indicator of EUR 121/km2 of which an assumed 60% gives the indicator control cost of EUR73/km2 for the EEZ.

In using the cost data on Member States to arrive at equivalent for non-Member States it should be understood that interviews confirmed all such States in the scenarios (Table 13) have functional fisheries control systems and inspectorates. Consequently the most representative way of filling the gaps is to regard them as having average means of control. Thus, removing the highest and lowest values for control cost/km2 in Table 13 and taking the mean for the remainder, provides an average value of EUR151/km2 to apply to non-Member States. The control of the open seas of an EEZ may not require quite the same intensity of coverage as the territorial seas where overall fishing activity tends to be higher therefore the cost indicator for control of the EEZ is taken as 60% of that for the territorial sea. This assumes these average costs for a control system equivalent to those of the Member States on a standardised basis.

### 6.3.3 Summary of scenario costs and benefits from changes in access rights as indicated by landed values

In Section 8.2 above the potential changes in fish catches have been estimated both in weight and value if a country's fishing access opportunities were limited within a declared EEZ but which that country had exclusive use of. In modelling the change in benefit from the catch value, some were winners and some were losers. However, to estimate the true change in benefit from the catch the costs attendant upon the expanded responsibilities for data collection and control, as assessed in Section 6.3.2, must also be taken into account. The estimated costs for data collection and control for each EEZ area have been added together to give total incremental costs.

This can be done on two bases. Firstly with EU Member State as separate entities (Table 14) and all states taking responsibilities for all those resources and fishing opportunities in their own EEZ. Or, alternatively, with Member States protecting also those fishing opportunities which other Member States are currently using, in line with the CFP (Table 15).

***Straits of Sicily/Malta***

The impact of this scenario is most severe on Italy which loses almost 20% of catch value (projected EUR286 million compared to current EUR359 million, Table 14) from lost fishing opportunities which, even with those gained, still results a very large net deficit at almost EUR 57 million (Table 14). This is mitigated somewhat if its EU access rights are protected by other Member States when loss of access is limited to an equivalent of –EUR 16 million (Table 15) This is compounded further when the costs for control and data collection responsibilities are added to this deficit. By contrast, Tunisia gains considerable value from regaining fishing opportunities from other States such that, even when costs for control and data collection are taken into account, there is a substantial positive increment of some EUR 10.6 million. Malta is similar to Tunisia in as much as there is a relatively large increment from regained fishing opportunities particularly when treated as a separate entity (Table 15).

***The Adriatic***

Both Croatia and Montenegro gain sufficient opportunities that the value is still significantly positive even after the incremental costs of data collection and control are taken into account. All the rest show net losses which are compounded when the additional costs are included. This is largely because the countries with smaller coastlines, and therefore smaller potential EEZs, are losing opportunities currently available to fish widely in the high seas areas. Italy loses access equivalent to almost 10% of the current landed value due to its fleet effectively using the access opportunities offered by the high seas areas.

***Gulf of Lions***

The indicator values for change in benefits from catch value are taken from Table 9 and those for control and data costs from Table 10 and Table 11. For control and data costs these value needed to be adjusted because only a portion of the EEZ of Spain (3651km2) is included in the scenario. In this scenario the fishery data used comes principally from the Gulf of Lions GFCM area declarations which only include a small portion of the Spanish EEZ (see Section 7.4.1).

The picture from the scenario suggests the French industry is currently taking more from the high seas sector which, under Option 1 the 'no zones' scenario, would revert to the EEZ of Spain - than the Spanish vessels. Again, in relation to the Option 1 simulation without Spain's present FPZ (see Section 5.2.2), if this catch were to be brought into the Spanish sector then there would be a significant increase to their catch which would still be the case even after the increased costs for data collection and control are taken into account (Table 14). The loss to France would be significant although only around 15% of the current catch from the Gulf of Lions. The relative gains and losses are further magnified if the resource rent is used as the indicator.

With both countries being EU Member States it would be assumed that if both declared EEZs then historical fishing rights would be respected and that France might still retain rights the catch which might be in the EEZ (and may well actually be in the FPZ of Spain) (Table 17). In this case the catch opportunities would be protected by the neighbouring MS and there would be no net gain or loss. There would, however, be the incremental cost of data collection and control in the new EEZs which would ultimately result in a net loss compared to current circumstances. These are a relatively small proportion of the French catch but a serious expense compared to that taken by Spain in this area (Table 14).

**Table 14 Summary of scenario costs and benefits with Member States as separate entities (EUR millions)**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania |
|---|---|---|---|---|---|---|---|---|---|
| **Current Catch (€)** | 5.85 | 91.8 | 359 | 39.4 | 0.45 | 103,15 | 340,8 | 1,59 | 14,28 |
| **Projected Catch (€)** | 62.1 | 106.8 | 286 | 36.9 | 3 | 134.9 | 283.6 | 3,23 | 12,18 |
| **Net catch Gain / Loss (€)** | 56.2 | 15 | - 73 | - 2.5 | 2.55 | 31,8 | - 57.2 | 1,64 | - 2,1 |
| **Incremental control & data costs** | - 4.25 | - 4,4 | - 16 | - 5.6 | -1.1 | - 2.5 | - 47,9 | - 0.41 | - 0.51 |
| **Net catch Gains/Loss less control & data costs** | 52 | 10,6 | - 89 | 8.1 | 1.45 | 29,3 | - 105.1 | 1,24 | - 2,61 |

**Table 15 Summary with Member States as EU entities (EUR millions)**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania |
|---|---|---|---|---|---|---|---|---|---|
| **Current Catch (€)** | 5,85 | 91,8 | 358,7 | 39,4 | 0.45 | 103,15 | 340,8 | 1,59 | 14,28 |
| **Projected Catch (€)** | 6.99 | 106.8 | 342.6 | | | 134,9 | 310,46 | 3,23 | 12,18 |
| **Net catch Gain / Loss (€)** | 1,14 | 14,99 | - 16.1 | 0 | 0 | 31,8 | - 30,4 | 1,64 | - 2,1 |
| **Incremental control & data costs** | - 4.25 | - 4.4 | - 16 | - 5.6 | -1.1 | - 2,5 | - 47,9 | - 0.41 | - 0.51 |
| **Net catch Gains/Loss less control & data costs** | - 3.1 | 10,6 | - 32,1 | -5.6 | -1.1 | 29,3 | - 78,3 | 1,24 | - 2,61 |

***Overview***

On the basis of change in access rights as indicated by estimated changes in value of landed catch it appears Tunisia, Malta, Croatia and Montenegro will benefit overall by gain in access rights (Table 14). By contrast, Italy will lose substantial access rights in both Straits of Sicily and Adriatic scenarios currently being exploited from the high seas.

Changes across Member Sates if they protect Member State catches are rather more limited (Table 15). Summing the current catches currently protected by neighbouring Member States across all scenarios (Table 9, Table 10 and Table 11) produces a total EUR55.7 million as representing the total catch value protected by other Member States from a total catch value from those States of EUR746.5 million, i.e. 7.5%. This is an indicator of the value added of being within the Community in this sector.

Of course the model represents a simplified version of events in order to test the hypothesis on the impacts of EEZs. No doubt in the event of such declarations there will be negotiation on bilateral fishing agreements between States or multilateral if the EU acts for member States. Never the less such agreements often have costs attached to them as compensation for the host State or a requirement for reciprocal exchange of rights as happens between the EU and Norway. So these scenarios retain their validity in principle but the costs are subject to negotiation.

States may also choose whether they pay for the extra data collection and control necessary for sustainable management but there is a hidden bonus here. It does appear as if those costs are significant but if States take proper responsibility for the stocks they have acquired then the better management will be reflected in stock recovery of those which are damaged with a consequent increased yield. Certainly, for Member States, this will be consistent with the commitment of the CFP towards attainment of MSY and the ecosystem approach to management.

### 6.3.4 Further benefits from stewardship and management

Using the actual value of landed catch as an indicator does not tell the whole story. Converting the change in fishing access offered by EEZs from tons into monetary terms still reflects the change in 'ownership' through fishing opportunities rather than the real potential benefit of using those rights to improve management. There are additional benefits from judicial responsibility for the fisheries. It was discussed above that the incremental costs for control and data collection were included on the assumption that the responsibilities assumed included the need for sustainable management of the resources. This naturally also should have additional benefits particularly in stocks which have been fished beyond their sustainable yield. An EEZ will enable recovery plans and management plans to be implemented which would be very difficult under high seas conditions. There is also evidence that once a State assumes responsibility for a fishery that it can also enhance the added value of downstream activities.

To capture what might be thought of as a management bonus, a factor termed the **resource rent** can be used (e.g. Gordon 1954 and 1991)[224]. This factor represents the sustainable contribution that the fish resource could make to economic growth and social welfare if management opportunities are used to improve the stocks back towards maximum sustainable or maximum economic yield. Many stocks in Europe, including those of the Mediterranean, have been fished down below these levels and so have scope for improved

[224] Gordon H.S. (1954). The economic theory of a common property resource: the fishery. Journal of Political Economy 62: 124-142. Reprinted 1991 Bulletin of Mathematical Biology 53: 231-252.

returns (EEA, 2009)[225]. Resource rents are now often used as indicators of the potential full economic benefits from fisheries when they are managed sustainably (World Bank, 2008)[226] most recently in the Mediterranean by Plan Bleu (2010).

Some international benchmarks now exist for the estimate of potential rents based on the value of landings. Two important benchmarks are:

- That fisheries that are exploited under institutional arrangements that encourage economic efficiency (e.g. ITQs and TURFs) can generate rents that are around 60% of landed value through cost savings (e.g. World Bank 2008)
- That such fisheries also generate substantial rents through added value to the catch. On average, this figure appears to be some 35% of landed value (World Bank 2008).

Experience suggests that in many fisheries, rents tend to increase through the latter route first. The fact of taking 'ownership' appears to lead to a rationalisation of downstream processing and marketing for products which now come from the 'national resource'. Of course, these figures are indicative and will vary from fishery to fishery and over time. The estimated resource rents calculated as above are shown in Appendix 2.

The benefits of extending jurisdiction would therefore appear to have two components:

- firstly the change in rights to fishing opportunities as exemplified in the previous section and
- the improvement in yields through sustainable management due to proper control and data availability offered by the rights of an EEZ or FPZ with the potential indicated by the resource rent.

The mere fact of extending fishing zones alone will not lead to resource rents being earned on a sustainable basis. Only certain kinds of management regime have proved capable of generating rents sustainably (e.g. in New Zealand and Norway). Such regimes are generally based on fish harvest rights expressed either in terms of individual catch allocations or in terms of space. Effort based systems do not seem to offer this presumably because of the more confrontational controls required rather than the more direct stake offered to the fishing communities by rights-based regulation. These requirements are consistent with developing events in EU countries where the on-going reforms of the CFP include greater reliance of the MSY as a reference point in management.

Fisheries management in the Mediterranean is currently overwhelmingly effort-based and for this reason the expectation is that sustainable resource rents are currently close to zero and the gap between potential and actual rents must be very large. Moreover, the stocks which are open sea in their distribution are often in high seas areas where there are no national rights and responsibilities. There are cases where international regulation has an effect, principally the Bluefin tuna which is regulated by ICCAT and controlled by joint EU and national effort drawing authorisation from ICCAT (see Section 12 for analysis). Never the less there seems no doubt that the stock has been fished down to dangerously low levels to the extent that, a year ago, it was considered for CITES listing. Even here, therefore, for such an important fishery, governance appears not to have been as effective as it could be. This gives further indication that the current resource rents from the high seas fisheries must be very low or zero at the moment.

[225] EEA (2009). Progress towards the European 2010 biodiversity targets. European Environment Agency, EEA Report No 4, Copenhagen, 2009.

[226] World Bank (2008). The Sunken Billions: the Economic Justification for Fisheries Reform. World Bank Washington DC, FAO Rome.

This then gives us a simple model for the options available on the proposition that fisheries jurisdictions are extended over the present high seas areas as an EEZ or FPZ. There are three elements in the model:

- The change in fishing access rights as indicated by the net change in landed value from Table 14; **A**
- The management bonus from sustainable management of resources using rights enabled by an EEZ represented by the resources rents (Appendix 2) estimated using the two benchmarks given above (World Bank 2008); **B**
- The incremental control costs necessary to enforce management measures taken from Table 14. **C**

The first element A, represents the option when an EEZ is declared, thereby changing rights to fishery access, but without a proper sustainable management regime.

The second element B, represents the potential bonus if the stocks within the EEZ are sustainably managed and the value added opportunities are galvanised.

The third element C, is the estimated increased costs of fisheries control and data collection essential for achieving the sustainable management which drives the achievement of the resource rents. As such they must be subtracted from the resource rents B to arrive at an indicator of the net benefit that may ultimately be available from sustainable management and improved value-added processes.

Adding this net value from the resource rent to the monetarised benefits of change in access rights A, gives a compound index of the option of the potential benefits that are possible if the EEZ is declared, thereby changing the access rights and also an appropriate sustainable management system including effective control, is also put in place.

The resource rents have been estimated for each country as outlined above and they are included in the Appendix 2. These resource rents are for whole maritime zones for a country and have been adjusted proportionately where only a part of the zone is represented. Applying this model to the various countries in the scenarios provides the view given in Table 16.

In Table 16, line **A** shows the net gains in terms of fisheries access opportunities with the creation of an EEZ from Table 16. Essentially, on this basis, Italy shows a loss of access because currently its fleet is the most wide-ranging and will find its immediate access to previously high seas stocks more limited. That is not to say, in reality that it may not engage if fisheries agreements with the new stewards of the stocks but that, effectively, is a cost. These comments are not directed at specific countries but meant to examine the type of issues that arise when the access rights change

**Table 16 Summary of indicative net gains and losses (EUR millions) for an EEZ with (B) and without (A) a sustainable management regime**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania |
|---|---|---|---|---|---|---|---|---|---|
| **A. Net Gain / Loss (€)** | 56.2 | 15 | - 73 | - 2.5 | 2.55 | 31,8 | - 57.2 | 1.64 | - 2,1 |
| **B. Potential Resource Rent *** | 107 | 149 | 147 | 35.8 | 8.4 | 109 | 187 | 1.87 | 6.5 |
| **Index of EEZ change (A+B)** | 163 | 164 | 78.2 | 33.3 | 10.9 | 140.8 | 130 | 3.5 | 4.4 |
| **C. Incremental control & data costs** | 4.25 | 4.4 | 15.9 | 5.6 | 0 | 2.5 | 47.9 | 0.41 | 0.51 |
| **Net catch Gains/Loss less control & data costs (A+B-C)** | **158** | **160** | **62.3** | **27.7** | **10.9** | **138.3** | **82.1** | **3.1** | **3.9** |

**adjusted from estimated country values in Appendix 2 for slightly different total landing values*

Once the State takes stewardship of its resources and also introduces an effective management system for sustainable management enabled by effective control then increased returns become possible both from the management and also from improved value added opportunities which have been noted empirically to be the case. The scope for these management increases is indicated by the resource rent given in line **B.** From this it can be seen that the potential increases are quite significant.

This is particularly the case when the two lines of benefit are added together, ie. the change in fishing access rights and the management bonus denoted by the resource rents (line **A+B**). At this point all countries can be seen to have the potential for significant development of their fisheries sector.

The same remains the case even when the costs of increased data collection for management and extended fishery control, which will be an essential part of the sustainable management system, are subtracted (line **A+B-C** in Table 16). Clearly the potential gains are reduced but not to a great extent.

### 6.3.5 The relative significance of control and monitoring costs in EEZs

From Table 15 (and 14?), Section 6.3.3, it appears that the incremental cost of fisheries data collection extending within EEZs of the selected countries would be EUR 22.48 million over a total EEZ area of 823,844Km2 of the Mediterranean covered by the scenarios. Given that the total area of EEZs across the Mediterranean is 1,374,013km2 then on a pro rata basis, with the EEZ area within the scenarios being 60% of the total area, the incremental annual cost for the whole sea would be EUR 41.3 million. This is not so much a real potential cost but an indication of the relative cost that Mediterranean coastal States must pay if they face up to their responsibilities of 'ownership' and the proper management of resources.

On a similar basis the total incremental control costs for all the 823,844km2 of the potential EEZs is equivalent to some EUR 80 million. Given that this area is 60% of the current high seas area as described above then the indicative cost of adequate control annually for the responsible management of those resources is EUR133.3 million across the open sea areas of the Mediterranean as a whole.

In monetary terms these appear quite large values but they need to be compared to the value of the resource they are protecting. The fishery resource rent for the whole open water ecosystem of the Mediterranean has been estimated (see Appendix 2). The resource rent represents the benefits derived from the sustainable element of the catch as opposed to the component that is 'mined' from the natural capital. It is also based on the Gross Value Added to the catch and so tends to be rather more than the just the market value. It reflects the value to the sector including social benefits (wages etc). This however, represents to important sustainable core of the fisheries that the data collection and control are aimed at managing and protecting.

A comparison of the cost and benefit indicators for potential EEZ area of the whole Mediterranean is shown in Table 17.

**Table 17 Indicative net value of Mediterranean open sea fisheries**

| EEZ Med values | EURmill | Indicators EUR/km2 |
|---|---|---|
| Data costs | 41.3 | 27.3 |
| Control costs | 133.3 | 97 |
| Sub Total Costs | 174.6 | 212 |
| Resource rent * | 3,483 | 1,050 |
| Net value | 3308 | 4,427 |
| Cost as % Net value | 5.3% | |

From this it can be seen that, although the costs are significant they are only 5% of the potential sustainable value from the resources which would still have a net value of EUR 3,308million per year. This would seem a reasonable price to pay to approach the benefits offered by sustainable management.

### 6.3.6 Final overview

In conclusion, the model suggests that merely claiming the EEZ creates a situation where some countries gain access rights and some lose access, particularly those countries with the wide ranging fleets. If this is combined purely with an extended data monitoring and control system but without an effective management process being in place then the additional costs from these negates any potential gains from improved access in most cases (Table 14).

However, an EEZ with the improved control that this allows, together with an effective management system, opens up possibilities of greatly improved returns in virtually every case (Table 16). It is to be anticipated that the reformed CFP would be such an effective management system amongst Member States which would help them to achieve the potential outlined above if it were to be combined with EEZs in the Mediterranean.

## 6.4 A Fisheries Protection Zone – the case of Spain

### 6.4.1 Origins of the zone

In considering potential zones, it is useful to draw on practical experience where that exists. In the case of fisheries, Spain's experience with a fisheries protection zone may offer some insights for future zonal development particularly in conjunction with the above analysis.

The Spanish FPZ was implemented in an attempt to improve exploitation patterns of bluefin tuna. As tuna prices began to increase in the 1980s with the increasing popularity of sushi-

sashimi products so did the level of production. Declared catch peaked in 1996 at 53,000 tonnes, of which almost three-quarters came from the Mediterranean (Ifremer, 2006)[227]. Moreover, this boom in declared landings seems to have been accompanied by significant amounts of illegally-caught fish.

Against this background, Spain seems to have had two motivations in establishing a Fisheries Protection Zone in 1997. First, the seas around the Balearic Islands are known to be a major nursery ground for bluefin tuna. An FPZ was intended to protect this area. The question of protection from whom, elicited different answers from different respondents during our fieldwork interviews. Generally, respondents felt that the FPZ was primarily intended to reduce fishing pressure by Japanese and Korean fishers; some however felt that it was also a means to reduce drift-netting some of which was being undertaken by EU fishers.

The second motivation for the FPZ was an attempt to favour small-scale and traditional fishing activity (see http://noticias.juridicas.com/base_datos/Admin/rd1315-1997.html). Large-scale fishing at the boundary of the territorial sea represented a threat to such activity. However, the apparent catch by the purse seine fleets suggests that this result may not have been achieved to a significant degree.

### 6.4.2 Impact of FPZ on tuna fishing

At the time of the implementation of the FPZ in 1997, the Balearic sea was a key nursery area for bluefin. However, according to IFREMER (2006) the impact of the FPZ was limited due to a sudden change in tuna spawning areas. Although the number of these areas is limited and does not change, their relative importance does, and from 1997, the importance of the Balearic Sea declined as the importance of the Gulf of Sidra increased.

One, but by no means the only, interpretation of this result is that the FPZ was successful in displacing a substantial amount of fishing effort from this area to other parts of the Mediterranean. Although this would have achieved the initial purpose of the FPZ, it would of course have to be supported by other measures to achieve the bigger goal of bringing bluefin catch into line with the sustainably available possibilities.

Regardless of interpretation, what is clear is that environmental NGOs seek to reinforce the FPZ through the declaration of a bluefin tuna sanctuary around the Balearic Islands. For example, an online petition in support of such a sanctuary remains open at http://www.thepetitionsite.com/1/create-sanctuary-for-blue-fin-tuna/.
It remains difficult to determine any lasting positive impacts of the Spanish FPZ on bluefin tuna catches against an overall background of decline. It was probably too limited to have a significant effect, on its own, on this wide-ranging, heavily exploited species.

### 6.4.3 Impact on fisheries in general

No study of the impact of the FPZ seems to have been undertaken, or published at least. This would seem like a very useful exercise to undertake. Only fragmentary evidence is available at the moment. One useful source is a recent study undertaken for the Plan Bleu (Garcia 2008)[228] which provides some information on the comparative performance of different countries.

[227] Ifremer (2006) “Le thon rouge, une espèce surexploitée”. Ifremer, Brest, 14 pp.

[228] Garcia S. (2008) Long-term trends in small pelagic and bottom fisheries in the Mediterranean: 1950-2008”.Plan Bleu, Sophia Antipolis

It is difficult to conclude from it anything other than that Spain has so far not taken full advantage of the possibilities offered by the Fisheries Protection Zone. The possibilities that such a zone offers are developed further in Section 13.2. Had Spain done so, one would have expected Spanish fishing to be in an improved State compared to other countries but there is no evidence of this in the report (Garcia 2008).

For instance, Garcia (2008) analyses fish production patterns using a classification system whereby countries may be considered as developing, mature (i.e. stable), declining or recovering. When looking at overall catch France is classified as mature but Spain as declining. For pelagics alone, the classification is the same. From the data presented it is clear that no impact is discernible of the implementation of the FPZ in 1997.

The results for demersal fish are similar. France and Spain are ranked the same but only because France is also classified as in decline in this case. Again, no impact of the FPZ can be discerned.

The Plan Bleu is also undertaking a companion study of the economics of fishing. This has yet to appear. It is possible, although perhaps unlikely, that an assessment of purely economic indicators will lead to different conclusions.

Otherwise, economic data on Spanish fishing is extremely difficult to obtain. In what seems to be the most recent Annual Economic Report on the European Fishing Fleet (IPSC, 2009)[229], the section relating to Spain economic data is sparse and the AER does not distinguish between Atlantic and Mediterranean fisheries.

### 6.4.4 Conclusion

Experience to date with the FPZ in Spain seems to demonstrate the key point that a fisheries zone offers only the potential to improve the exploitation of a country's fish resources. The analysis above indicates the potential benefits of using control powers to implement a sustainable management plan. There appears to be a need to develop and implement specific policies to deliver this potential, the zone in and of itself appears to have only marginal impact (see Section 13.2).

## 6.5 Indicators of social change

The changes in catch opportunities identified in the previous section will clearly have implications for employment in the national sectors. To examine this the best figures the can be found are the 2007 employment figures from the 2010 edition of the "Facts and Figures on the Common Fisheries Policy" document produced by the Commission[230] taken from the Annual Economic Report. This has the closest data we need to our current estimates from which an employment indicator can be developed. We make the assumption there has not been a great deal of change in the fisheries and processing sectors between 2007 and 2008 which is the year of the fisheries data. This data is only available for EU Member States to which the model is therefore limited.

Since we have the value of the catch and the number of producers employed in that year an estimate of production in terms of EUR/producer can be determined. Applying this to the

[229] IPSC (2009) "The 2009 Annual Economic Report on the European Fishing Fleet" Institute for the Protection and Security of the Citizen, Joint Research Centre, European Commission. 311p.

[230] http://ec.europa.eu/fisheries/documentation/publications/pcp_en.pdf.

potential changes in catch (Table 11 – Table 13) enables the respective indicative monetarised gains and losses in employment to be estimated for each State in each scenario. Dividing this by the average productivity per employee in the EU fisheries sector provides a further indicator of the number of jobs gained or lost.

Therefore putting this into the model we get the following in terms of the change in number of people employed by sector, by State by scenario.

***Member States as EU entities***

The above process has been applied to Member States as EU entities where traditional fishing grounds in neighbouring Member States have been protected under the CFP to the three scenarios (from Table 17).

**Adriatic**

| **Member State** | **Italy** |
|---|---|
| Estimated Change Fishing Sector | -265 |
| Estimated Change Processing Sector | -81 |

**Gulf of Lions**

| **Member State** | **France** | **Spain** |
|---|---|---|
| Estimated Change Fishing Sector | 0 | 0 |
| Estimated Change Processing Sector | 0 | 0 |

**Straits of Sicily/Malta**

| **Member State** | **Italy** | **Malta** |
|---|---|---|
| Estimated Change Fishing Sector | -193 | +54 |
| Estimated Change Processing Sector | -59 | @NA |

*Malta has no recorded figure for the processing sector.*

***Member States as separate entities***

Here the analysis is repeated but for only national waters catch with other protected rights excluded. This shows a rather bleaker picture, which makes the protected rights issue within EU Member States and their EEZs much more important

**Adriatic**

| **Member State** | **Italy** |
|---|---|
| Estimated Change Fishing Sector | -912 |
| Estimated Change Processing Sector | -278 |

**Gulf of Lions**

| Member State | France | Italy | Spain |
|---|---|---|---|
| Estimated Change Fishing Sector | -12 | 0 | <1 |
| Estimated Change Processing Sector | -13 | 0 | <1 |

**Straits of Sicily/Malta**

| Member State | Italy | Malta |
|---|---|---|
| Estimated Change Fishing Sector | -530 | -8 |
| Estimated Change Processing Sector | -162 | @NA |

*Malta has no recorded figure for the processing sector.*

***Employment from adoption of sustainable management***

Based on estimates of potential resource rent from Section 6.3.4. and with States as separate entities (Table 18) the national productivity rates per employment enable the impacts on this to be estimated. A considerable increase in employment would follow in both sectors on the back of what is essentially the management bonus from yield increases from more sustainable management.

**Adriatic**

| Member State | Italy |
|---|---|
| Estimated Change Fishing Sector | 1,313 |
| Estimated Change Processing Sector | 402 |

**Gulf of Lions**

| Member State | France | Spain |
|---|---|---|
| Estimated Change Fishing Sector | 143 | <1 |
| Estimated Change Processing Sector | 146 | <1 |

**Straits of Sicily**

| Member State | Italy | Malta |
|---|---|---|
| Estimated Change Fishing Sector | 454 | 217 |
| Estimated Change Processing Sector | 138 | @NA |

*Malta has no recorded figure for the processing sector.*

The information in the model does not allow a good estimate of the potential gains of Spain as a whole but given that the resource rent for the whole of the Spanish catch in the Mediterranean is EUR 209 million which gives an indication of the potential gains from sustainable management which is possible using the rights provided by an EEZ, then the potential increase in employment would be some 1003 in the fishing sector and 1024 in the value added sector assuming rates of productivity are equivalent to France. Clearly, a significant boost in employment would be gained with EEZ and a sustainable management plan that this enables.

## 6.6 Wider environmental effects

To address the wider view of impacts on the ecosystem is clearly a complex issue. One indicator which has been used is the Marine Trophic Index (MTI). This was first developed to assess the incidence of the phenomenon of 'fishing down the food web' which results from the selective removal of certain feeding categories of fish from the ecosystem, starting with the large predatory types (Pauly et al 1998)[231]. Predatory species tend to occupy higher levels of the food web where a top predator could be number 5 in the food chain wheras a true herbivorous fish, or primary consumer, would be at level 2 with the plants being level 1. As a fishery develops typically the large predators dwindle first with the result that average trophic or feeding level declines as first noted by Pauly et al (1998). This decline in average trophic level has become combined into the Marine Trophic Index which is compiled most often be analysing catches by the trophic level of each species with a weighting by abundance and noting how it changes with time (Pauly et al 1998; Pauly and Palomares 2006[232]).

The MTI has had its critics (eg. Caddy et al 1998[233]; Branch et al 2010[234]), given the problem of assessing the ecosystem affects of fishing, has never the less been adopted by the Convention on Biological Diversity[235] followed by the European Environment Agency (EEA)

Which included it in their Streamlining European Biodiversity Indicators (SEBI) programme to measure progress towards the 2010 biodiversity targets of Europe of which the MTI was one of those for the marine ecosystem. Our approach here is therefore consistent with that of the EEA.

During the SEBI programme the MTI for Europe's seas have been calculated including for the Mediterranean[236]. The annual average MTI from catches in the Mediterranean over the last 60 years are shown alongside those from other semi-enclosed seas the Baltic and the Black seas, in Figure 13.

[231] Pauly, D., Christensen, V. DalsgaardJ., Froese, R. And Torres, F.J. (1998). Fishing down marine food webs. Science 279: 860-863.
[232] Pauly, D. and Palomares M-L (2006). Fishing down marine food webs: it is far more pervasive than we thought. Bull. Mar. Sci. 76: 197 – 211.
[233] Caddy, J.A. Csirke, J., Garcia, S. and Grainger, R.J.R. (1998). How pervasive is 'Fishing down marine food webs'? Science 282: 1383.
[234] Branch T.A. et al (2010) The trophic finger print of marine fisheries. Nature 468: 431-435
[235] Secretariat of the Convention on Biological Diversity. Global Biodiversity Outlook 2: 2006.
[236] http://www.seaaroundus.org/

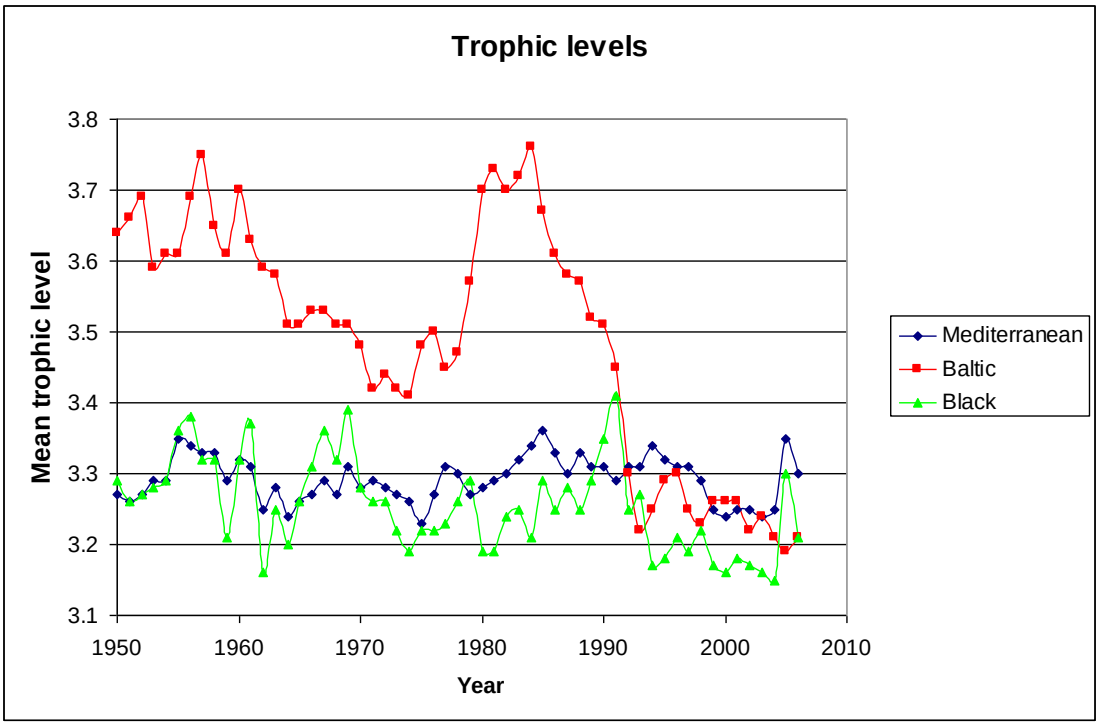



**Figure 13 Marine Trophic Index changes in the Mediterranean, Baltic and Black seas**

The annual changes for the Baltic show what has become taken as the typical pattern of the changes in a fishery with an important component of predatory species. (Figure 13) The fishery starts off with the MTI being relatively high at between 3.6 and 3.7 but declines quite sharply towards 3.2. This can be as the predatory cod biomass being reduced compared to that of the planktivorous sprats and herring. Less dramatic are changes in the Black Sea where the MTI varies between 3.4 and 3.15. A trend line does show a progressive decline although there is a considerable annual variation. The trend is reflected in a qualitative appreciation that of the 23 species which appeared regularly in catches in 1965 only five are now harvested in significant quantities, chief amongst these in the anchovy (Zaitsev and Mamaev 1997[237]; GFCM 1997[238]). It is the large year to year variation in the planktivorus anchovy that is linked to the variation.

In contrast, the MTI of the Mediterranean has remained fairly stable around 3.3 albeit at a relatively low level. This could be interpreted as showing no great change in trophic structure under the effects of fishing over the time period in question. There is the possibility, however, that unlike the fisheries of the Baltic and Black Sea the primary development of Mediterranean fisheries occurred at an even earlier stage and that the ecosystem and the fishery have entered a long-term equilibrium. Such a stable pattern at a low value has been interpreted as a situation where all trophic levels have been fished more or less equally to a point of overfishing (Branch et al 2010). This would be consistent with the situation envisaged in Section 6.3.4 where the resources rent on the fisheries is more or less zero at the moment.

A further index related to the MTI has been devised which is based on the situation that as the fishery becomes to depend upon species further towards the base of the food web their actual production per unit biomass is higher so that catches of these species can increase.

[237] Zaitsev, Y. and Mamaev, V. (1997). Marine biological diversity in the Black Sea. GEF Black Sea Env Prog., UN Publications NY 207pp.
[238] GFCM (1997). Environmental management of fish resources in the Black Sea and their rational exploitation. Studies and Reviews 68, FAO Rome, 177pp.

The rate of biological production is much greater at lower trophic levels than it is at higher levels. Fisheries catches, at least to begin with, will tend to increase as the trophic level declines. At this point the fisheries will target species lower in the food web. This led Pauly et al (1998) to construct a "Fisheries in Balance" index, usually called the FiB index to show how relative production might vary with change in average trophic level. The avaerge change in this FiB index, using the same data source as that for the MTI, for the Mediterranean and the two other seas is shown in Figure 14.

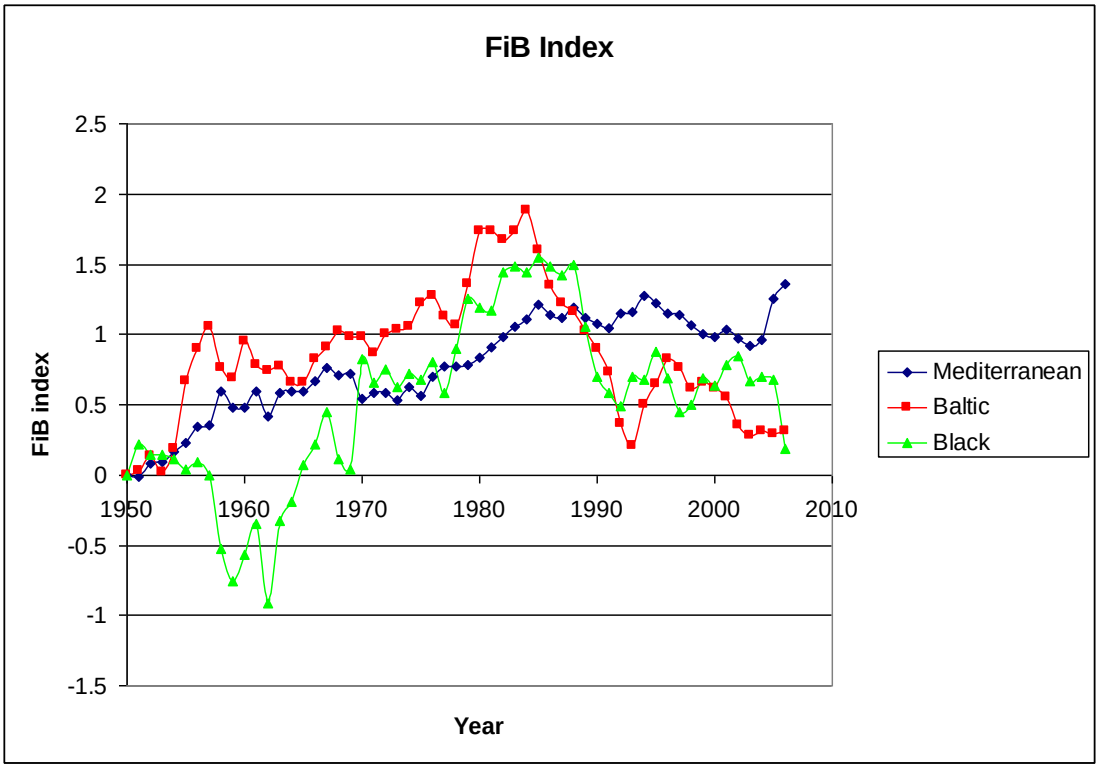



**Figure 14 Annual changes in the 'Fisheries in Balance' (FiB) index**

As predicted, as the MTI of the Baltic and Black seas decline, so the ratio of catch to trophic level increases until a new balance is achieved within the fishery. The Mediterranean also shows a more modest rise until 1980 when it levels off. If the major fishing down had happened at a slightly earlier time, or if the small changes in MTI had not been picked up in the data available, then something of a rise might be anticipated.

However, one thing is clear, both the MTI and FiB indices have been stable since at least 1980 which would indicate few changes caused to the ecosystem by fishing since then. It remains to be seen as whether this equilibrium has been achieved at a point when fisheries may be overexploited from previous eras.

Under more sustainable management which could go hand in hand with the creation and regulation of new maritime zones the biomass of the more valuable species such as red mullet and wild sea bass would be expected to increase. Since these are in the upper links of the food web the average MTI would be expected to rise to reflect this providing and indication of the wider ecosystem effect and the improved status of biodiversity.

# 7 Cost benefit model – vessel source pollution[239]

## 7.1 The value of an ecological protection zone– the case of France, before and after.

### 7.1.1 Background

In this sector the major pollution source considered is that from vessels transiting the open seas since most other sources of marine pollution are land based and affect the more coastal territorial seas. For France, vessel pollution was the major reason for the decision to create the ecological protection zone (EPZ) in order to eliminate the discharge of vessel sourced waste into the sea and the consequent degradation this caused. Many of the discharges were of a hydrocarbon nature but not all. A range of other hazardous wastes are also transported which may be spilled. A high proportion of incidents may actually be intentional in that tanker captains wash out their tanks in the open sea rather than using waste discharge points provided in many ports. It is this chronic, long-term release of waste into the sea which is the main target for prevention. The acute spills are usually the result of navigational or safety accidents often related to 'acts of God' such as storms or human failings. As such they are one-off events and less susceptible to systematic control.

In December 1999, the wreck of the oil tanker *Erika* off the coast of Brittany with the attendant spill galvanised the government of France to take drastic steps to ensure that the risks of such events were minimised. Moreover, in spring 2000 the French authorities noticed that captains were taking advantage of the proximity of the wreck of the Erika to deliberately discharge oily wastes. This made the authorities determined to act on such instances and apply the polluter pays principle to these cases. They changed the rules, making it no longer mandatory to sample and analyse the waste water onboard the offending vessel and its wake to prove guilt. Visual and temporal evidence became acceptable. In addition, the maximum fine for illicit discharge was increased in 2004 to 1 million Euros. Vessels caught in the act were now detained in port until a bank guarantee was deposited (e.g. € 500,000 for the *Pontokrastoras*, a Greek tanker, on 21 December 2003).

The General Secretariat of the Sea made the *Centre de documentation, de recherché et d'expérimentations sur les pollutions accidentelles*[240] (CEDRE) responsible for collating the data on aerial surveillance and occasional satellite data to help enforce this policy and CEDRE have provided many of the statistics upon which this case study is based. The manifestation of that determination in the Mediterranean was the creation of the French EPZ[241] since the new rules were only enforceable in waters under State jurisdiction.

The French EPZ in the Mediterranean came into effect on 10 January 2004, when an order was published in the Journal Officiel determining the limits of the zone (order n°2004-33 of 8 January 2004). This meant that France could now prosecute offences connected to marine water pollution outside the 12 nautical mile radius of the territorial waters, and up to 60 nautical miles from the coast, in accordance with MARPOL 73/78.

Before the EPZ, as with anywhere on the high seas, if a vessel is accused of a pollution violation then it can only be prosecuted by the flag State. The EPZ was really a response to the lack of action on behalf of certain flag States which, prior to the

[239] *This model was prepared prior to the claims by France and Spain for full EEZs and does not take into account the impacts of such claims.*
[240] The Centre of Documentation, Research and Experimentation on Accidental Water Pollution
[241] http://www.cedre.fr/en/discharge/illdisch/statistics.php

declaration of the EPZ, had responsibility for prosecuting offenders detected on the high seas. France had therefore found a solution based on the possibilities offered by MARPOL 73/78 and UNCLOS which became consolidated in French legislation. Thus France fully supported one of the convention's obligations, namely the obligation to protect the marine environment.

This obligation is aimed first and foremost at penalising vessels which disregard their own obligations and pollute the water beyond the boundary of territorial seas. This widening of the governance area offers a way of protecting the Mediterranean an option which has also been used by Croatia which has made a similar commitment to keep its seas clean to protect other economic sectors.

This new area provides more reason for aerial observation to detect polluters but, more importantly, a mechanism for the State to penalise directly a proven offender. By this system the incident is detected, usually by aerial or seaborne surveillance and/or satellite imagery, and attempts are made to identify offenders by photography or using vessel monitoring systems (VMS). When there is sufficient evidence the offending vessel can either be escorted into port or the owners can pay a bail which will be retained pending a prosecution. If found guilty, the owner must then pay a fine. There are therefore two significant elements to this situation; the first is that all actions are in the hand of the coastal State which is also the victim and secondly the coastal State is free to set a bail or fine which it thinks an appropriate deterrent. This can be up to EUR 1 million but, in one of the early examples, the Turkish container ship the *Timic*, caught polluting by the illicit discharge of oil in the Mediterranean EPZ on 29 January 2004, had to provide a bank guarantee of a more typical EUR 300,000 before being allowed to continue its journey (CEDRE footnote 1). In this context it is worth comparing with Italy, which did not have an EPZ at that time, and where the maximum fine is only EUR 3,000 and which can only be exacted by the flag State where an offence occurs on the high seas although detected by Italian surveillance near Italian waters.

An objective of this study is to assess the value of such an EPZ.

### 7.1.2 Establishing a value for the EPZ

Since 2000 CEDRE has kept much more rigorous statistics of incidents (Figure 15).

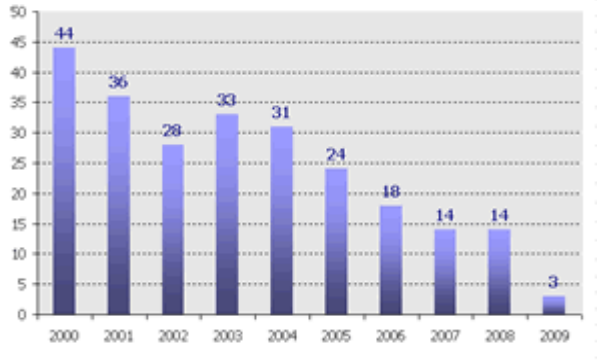



**Figure 15 Offences reported, identified and resulting in legal action (CEDRE)**

These show that since the awareness raising event of the Erika in 2000 and particularly since the declaration of the EPZ in 2003/4, there has been a steady decline in identified ship-based pollution events (Figure 165). The events given all subject to the owners paying a bail for the ships to progress and the amount of bail collected per year is shown in Figure 16. The resulting prosecutions gave rise to the fines shown in Figure 17.

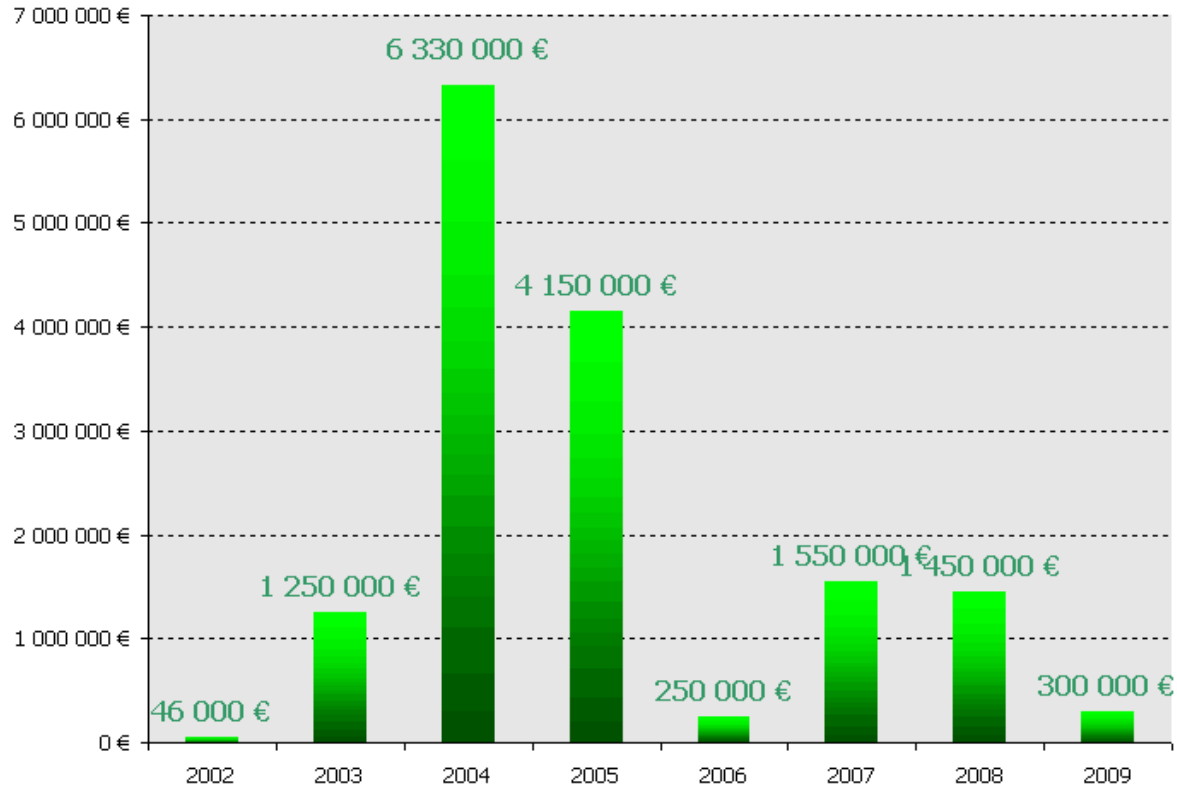



**Figure 16 Bail raised to allow progress of suspected vessel (CEDRE)**

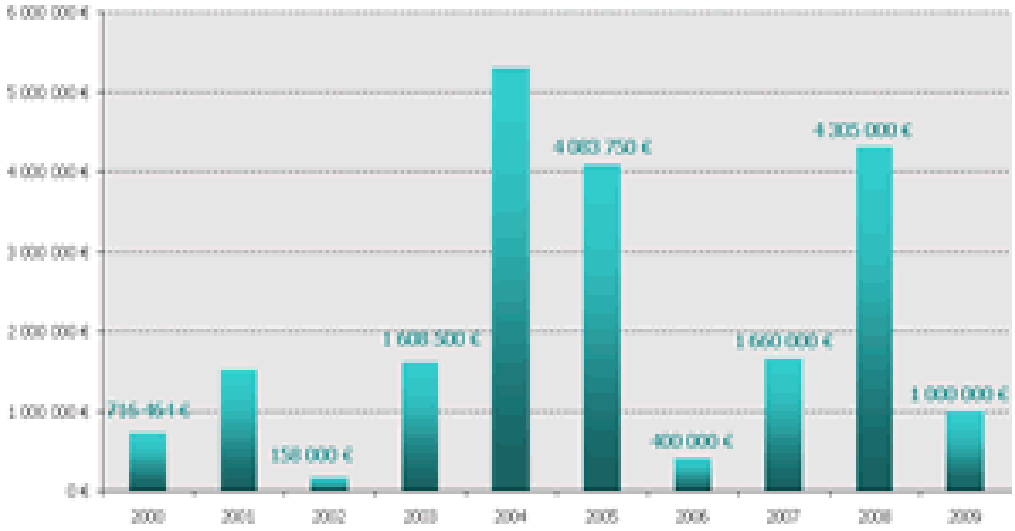



**Figure 17 Fines imposed on prosecuted offenders found guilty of incidents**

These statistics can help to analyse the effectiveness of the EPZ and also to build up a monetarised indication of the value of the EPZ in maintaining clean seas. The data from CEDRE is summarised and given a preliminary analysis in Table 18.

**Table 18 A summary of the numbers of identified offences and the value of bail and fines paid by offenders within the EPZ of France**

| Year | Offences | Bail (000EUR) | Fines (000 EUR) | Bail per Incident | Fine per Incident |
|---|---|---|---|---|---|
| 2000 | 44 | | 764 | | 17.4 |
| 2001 | 36 | | 1500 | | 41.7 |
| 2002 | 28 | 46 | 158 | 1.64 | 5.6 |
| 2003 | 33 | 1250 | 1609 | 38 | 48.7 |
| 2004 | 31 | 6330 | 5250 | 204 | 169.3 |
| 2005 | 24 | 4150 | 4084 | 173 | 170.2 |
| 2006 | 18 | 250 | 400 | 14 | 22.2 |
| 2007 | 14 | 1550 | 1660 | 111 | 118.6 |
| 2008 | 14 | 1450 | 4305 | 104 | 307.5 |
| 2009 | 3 | 300 | 1000 | 100 | 333 |
| Mean | 24.5 | 1916 | 207.3 | 93 | 123 |

The bail shows how much companies will pay to continue their business and gives some indication of the environmental cost of these incidents that could ultimately be reduced by the EPZ. Equally, the level of bail and fines is an indication of the determination of the State to maintain clean seas at the expense of an economic sector which jeopardises this and therefore the value the State puts upon the ecosystem services that derive from clean seas. This will be important to the State because a number of other economic sectors rely upon clean seas, particularly tourism, fisheries and aquaculture.

The peak in average level of bail in 2004, at EUR 204,000, shows a sufficiently high level to maximise deterrence and also presumably also emphasised the seriousness of the offences. As the EPZ took effect, the level of bail per incident declined again presumably reflecting the fact that captains were wary of committing the serious offences. By the same token, the level of fine has been increasing, demonstrating the continued determination of the State to persuade those that continue to offend to change their ways.

The average fine had risen to EUR 333,000 by 2009. It is these upper values that reflect the value that the State puts on the clean sea and the services that this provides and, of these, probably the level of fine is the best reflection of the determination of the State to make the polluter pay. It is proposed to use the average fine from 2008 and 2009, which amounts to **EUR 312,000 per incident**, as an indication of the value of clean seas. From the point of view of the State this represents the environmental value of those clean seas but from the point of view of those who jeopardise those seas it represents an environmental cost, ie. a compensation for benefits forgone if the practices are not controlled and the seas protected.

To examine the potential environmental cost of the threat from vessel pollution without the EPZ we can apply the unit cost indicator derived above to the situation before the EPZ was effective. In the years prior to the increased strictures of the EPZ, i.e. 2000 to 2003, the average number of confirmed incidents was 35 (from
Table 18) It will also be seen from Table 20, that after 7 years the incidents had been reduced from 35 to 3 per year, that is, by 91% which demonstrates the effectiveness of the EPZ.

These 35 incidents are those for which there was sufficient evidence for them to be brought to due process and the State to levy a fine or demand a bail and thereby express the value of the State on the services from the clean seas. This has enabled us to put a value or potential cost per incident, which as indicated above, is equivalent to EUR 312,000/incident. However, these 35 incidents at the peak of detection and before the EPZ began to reduce them down to three per year, are only a proportion of those actually detected by *Centres Régionaux Opérationnels de Surveillance et de Sauvetage Mediteranée* (CROSSMed), the agency talked with surveillance and control of the EPZ of France. At the peak, these 35 incidents occurred within a total number of detections of some 308 incidents per year of

which 209 were from vessels (CROSSMed 2010)[242]. The environmental cost of each incident will be the same, whether it is properly evidenced and processed or not, providing it is vessel related. Of these 209 per year some 35 entered the legal process, ie. 16.7%.

In monetarised terms, therefore, the total value put by the State on risk to services posed by vessel traffic is represented as the number of incidents multiplied by the unit value/cost for such a potential incident of EUR 312,000/incident. In the case of France, therefore, where there were initially 209 vessel-related pollution incidents per year before the EPZ was effective, suggests an indicative **environmental cost of EUR 65.2 million**.

Bearing in mind that the EPZ of France reduced incidents by 91% as demonstrated above then this indicates the **environmental value of the EPZ is EUR 59.3 million**. This represents an indirect valuation of the ecosystem services protected by the EPZ.

If we can find the proportion of vessel passages that gave rise to the incidents used to determine the value of the EPZ then we can apply these proportions to other situations for which some information on the number of passages through the areas of potential EPZs has been estimated to give a similar before and after effects and a value for the EPZ

In the case of France, how do the number of incidents relate to the actual volume of traffic through the region? As an indicator of the number of voyages through the region, CROSS MED reports that in 2009 the numbers of passages through the Corsica Channel and Bouches de Bonifacio were 22,162 and 2984 respectively and, in 2010, 20,734 and 3,457 respectively (CROSSMed annual reports). Since these are the principal transit zones for several major ports in the area like Genoa and Marseille, a total gives a good index of the intensity of traffic movement in the zone monitored by CEDRE and the Centre Regional Operationnel de Surveillance et de Sauvetage Mediterranée (CROSSMed) which gave rise to the above statistics.

There are no indications of major changes in levels of vessel traffic along this coast in recent years as indicated by REMPEC (2008) and records of major ports such as Marseille over the last few years. Thus, the totals for the two years, 25,146 and 24,191, can be averaged to an indicative 24,670 passages per year from which the number of pre-EPZ pollution incidents is some 209, as derived above. From this incidents occur at a level **of 0.85% of all passages** through the zone before it was established.

### 7.1.3 Further factors influencing effectiveness of the EPZ

Whilst the numbers of confirmed and identified incidents have clearly declined since 2003 ( Table 18), the same is not true of the total number of Marine Pollution Reports (polreps) which, if anything, rose slightly since 2003, at least up to 2008. This has been interpreted as meaning that the new legal and fiscal measures have definitely encouraged the vessel operators to avoid detection at all costs although they may still continue the practice with more stealth. In their annual report for 2010 CROSSMed also show that only 29% of the incidents were actually located in the EPZ. However, more recently CROSSMed also reports a steady decline in total incidents since 2008 this still confirms that the EPZ is reducing pollution incidents and, in fact, unlike the picture shown in the earlier years referred to above, is now reducing incidents overall. Presumably, since there is no advantage in captains taking their vessels into what used to be high seas areas where they can still be caught, they might as well discharge without deviation if they are determined to do it. Even so, the level of bail still represents a value put on preserving a clean sea and one which has

[242] CROSSMed Annual Reports, eg. *CROSS Méditerranée Bilan 2010,* Min. De l'Ecologie, du Developpement Durable, des Transport et du Logement, Affaires Maritime, Republique Francaise.

definitely obliged the operators to change their behaviour. The value of the bail is appropriate for enforcement as a deterrent but the problem now is one of detection.

The key element of the EPZ for France has been to be able to prosecute and penalise vessels as the coastal State. In fact, things are not quite so clear cut since, under Article 228 of UNCLOS, if the flag State is already prosecuting the vessel for the same incident the coastal State must concede the right. However, many merchant vessels have third party flags which are unlikely to prosecute before the coastal State. In any event, the effectiveness of the EPZ is manifest in Figures 23 and 24 and appears unlikely to be a major factor.

A further feature of the reports from CEDRE is that they actually include all pollution reports from both the Mediterranean and Atlantic seaboards. However, CEDRE have confirmed that over 80% of these reports come from the Mediterranean and over the last two years a comparison with the number of polreps coming from CROSS Med show these to be 86% for 2008 and 95% for 2009. The significance of this is that the Atlantic seaboard with a long history of full EEZs clearly deters polluters whereas the Mediterranean, without EEZs, is still seen as more permissive.

It is also notable that there is a regular seasonal peak in pollution incidents in the waters of France. This occurs every year in July and August and appears to be related to the seasonal increase in cruise and leisure traffic. In terms of the nature of pollution, some 53% of incidents on average are oil related although it can be as high as 70% in any one year but this pollution is by no means confined to hydrocarbons.

## 7.2 Indicative direct costs of the EPZ

### 7.2.1 Assessment of the costs

Whilst the State can put a value on clean seas as indicated by the extent to which they make the polluter pay this does have a direct cost of monitoring and enforcement. The bail and fine is only effective if the State has control of its waters and that this is enforced.

There is no question that it was the change in legal status with the creation of the EPZ which enabled the French State to exact the value it put on its clean seas and charged to polluters. Never the less this must also be enforced and this enforcement is coordinated in France by the Centre Regional Operationnel de Surveillance et de Sauvtage Mediterrannée (CROSSMed)[243]. CROSSMed was approached with a request for some estimate of the costs required monitor the passage of vessels for pollution but were unable to provide this since in addition to monitoring pollution they are also in charge of search and rescue and fisheries control and also other agencies contribute means to the operations.

Never the less it is possible to obtain some indication of the costs involved from the statistics provided by CROSSMed in combination with some cost indicators for control and surveillance obtained in earlier work. In carrying out a feasibility study and impact assessment of the Community Fisheries Control Agency (CFCA) by MRAG (2004)[244] produced some cost efficiency indicators for control and surveillance by air and sea. These were derived from a survey of activity and respective budgets across coastal States. These included, for the Mediterranean, averages represented by France, Spain, Malta and Greece and are given below in Table 19. Since these averages were estimated from 2003/4 data

[243] CROSSMed Annual Reports, e.g. *CROSS Méditerranée Bilan 2008, 2009, 2010,*Min. Del'Ecologie, du Developpement Durable, des Transport et du Logement, Affaires Maritime, Republique Francaise.
[244] MRAG et al (2004). *A study on the impact and feasibility of a Community Fisheries Control Agency*. Final Report; FISH/2003/10, DG FISH Brussels

some 8% can be allowed for inflation and these updated values (Table 19). The control costs for France alone at this time (2004) cannot be used since they were unacceptably low over this period according to the European Court which in 2007, ruled that France needed more commitment in this area. In addition using the average, adjusted for inflation, leads to a unit cost which can be used also for the other countries when applied to the scenarios.

**Table 19 Mean monitoring and surveillance unit costs for the Mediterranean from MRAG 2004**

| Means | Cost Indicator (EUR) | Inflation adjusted (EUR)* |
|---|---|---|
| Air surveillance | 842/hour | 909/hour |
| Air vessel sightings | 653/sighting | 705/sighting |
| Air infringements noted | 30,451/infringement | 32,887/infringement |
| Sea inspection/report | 4,931/inspection | 5326/inspection |

** An inflation increment of 8% is allowed to approximate 2010 prices.*

These unit cost indicators can now be applied to the statistics of the CROSSMed pollution surveillance operation for 2010.

Of the 242 pollution incidents reported in 2010, 93 were reported by aerial surveillance, 39 by satellite reports from EMSA under the CleanSeas programme, and 31 by vessel patrols. The remaining 79 were in coastal waters as a result of terrestrial discharges. The terrestrial sources are not relevant here leaving a total of 163. Applying the cost indicators from Table 19 provides the estimates summarised below in Table 20.

**Table 20 Use of mean Mediterranean cost indicators for surveillance to estimate indicative cost for pollution surveillance**

| | Reports | Cost/report (EUR) | Cost (EUR) |
|---|---|---|---|
| Aerial infringements | 93 | 32,887 | 3,058,491 |
| Vessel inspections/reports | 31 | 5,326 | 152,861 |
| Operational total | | | 3,211,352 |
| Processing/administration* | | | 1,806,387 |
| **Indicative Total** | | | **5,017,737** |

***** *Administration based on 36% of total costs from EC (2010)*

A survey of maritime data collection across EU coastal States (EC 2010)[245] suggested that costs for seaborne and aerial data collection took 64% of the total spend with the remaining 36% for the various processing and administrative functions accounting for the remainder. Using this proportion to add onto the operational total as per Table 20 means that the indicative costs of monitoring and surveillance of the CROSSMed operation is **EUR 5,017,737**. The administrative element will also include the need for liaison with EMSA regarding the satellite images since EMSA is providing this service via the CleanSeaNet in close to real time for Member States.

### 7.2.2 Summary of indicative costs and benefits of France EPZ model

The value of the EPZ in protecting the ecosystem services from vessel source pollution in France is estimated at EUR 59.3 million (Section 7.1.2). The direct estimated cost of monitoring and surveillance in the enforcement of this protection emerges as EUR 5.02 million (Table 20). Even so, it should be borne in mind that the operative element of this enforcement is actually the change in legal status of the zone without which enforcement and deterrence is very poor.

[245] European Commission (2010). *Marine Data Infrastructure – Executive Summary.* Publications Office of the European Union, Luxembourg, 23pp.

For the surveillance to be effective it needs to be distributed over the area of the EPZ. Since the area of the EPZ of France is some 78,000km2 and the cost is estimated at EUR 5.02 million (Table 22) then the **relative cost of surveillance is EUR 64.4/km2.**

From the above the incremental benefit is the difference between the value of the services as viewed by the State of EUR 59.3 millions and the costs of monitoring estimated at EUR 5.02 millions. Thus, from this difference the **incremental benefit of the France EPZ is EUR 54.3 million.**

However, beyond this estimate of the incremental benefit of the EPZ on the Mediterranean coast, this analysis also provides a model with indictor unit costs and values that will enable it to be applied to other countries within the scenarios. This model can be seen to have the benefit of both having unit values and costs whilst still relating the pollution driven element related to the number of vessel passages whilst the surveillance costs are a function of area.

## 7.3 Application of Model to Scenarios

### 7.3.1 Extrapolation of the model

So how can this value for the EPZ of France be related more generally to a model of situations where no EPZ currently exists? We know how many pollution incidents were detected before the EPZ was established and the indicator cost for such incidents. We also know that the EPZ of France effectively reduced such incidents, and therefore the indicative costs, by 91% thereby demonstrating the saving or value of the EPZ in monetarised terms. The number of incidents can be taken as being related to how many vessel passages were made through the area at the time which, in the case of France, was 0.85% (Section 7.1.2). Thus if the number of passages of potentially polluting vessels currently passing through the area which could be an EPZ then we can provide an indicator of how many are likely to cause incidents, namely 0.85% and since we also have an indicator of the environmental cost of EUR 312,000/incident then the total environmental cost can be determined of which 91% will give a monetarised value for the EPZ.

With regard to indicative control costs we have estimated that effective control in the case of France has a cost of EUR 64.4/km2 (Section 7.2.2) so with the estimated area of the EEZ for each country a value for the increased control cost can be derived.

The scenarios used are those given in Section 5.2.2, with the areas given for the maritime zones in Table 5. The exception is for the Adriatic which here includes Italy, Croatia, Montenegro and Albania, as per Table 5, but excludes Greece in this instance since it proved difficult to estimate the number of passages through this section of the Ionian Sea. Greece does, however, provide some interesting data from the tourism angle. For the purpose of defining the ‘no zone’ Option1, it is assumed Croatia does not have an EPZ.

### 7.3.2 The France/Spain Scenario

***Estimates of Vessel passage***

Since from the experience of France it has been possible to derive an indicator value for the environmental cost of a pollution per incident upon the maintenance of clean seas and also establish the proportion of those incidents to the numbers of passages through the EPZ it should be possible to use these unit indicators to put a relative value on the environmental cost in other scenarios if the number of passages is known. These are derived from REMPEC (2008), Lloyds Register and port websites.

The working to determine the number of passages is shown in the Appendix 4.

***Environmental Cost and EPZ value of France/Spain scenario***

The value of the EPZ for France has already been calculated at EUR59.3 million in the initial case study (Section 7.1.2) from which the conversion factors can now be applied to the waters off Spain.

An index of the total number of passages through the waters of Spain is estimated to be 13,578 passages per year. From the model for France without an EPZ, some 0.85% of these passages might be expected to result in pollution incidents. On this basis 115 pollution incidents might occur with a cost of EUR 312,000/incident giving a potential total environmental cost of EUR 36million**.** Since the EPZ can combat 91% of this threat then for **Spain** the **value of an EPZ is EUR 32.8 million**.

This can then be totalled with that for France of EUR 54.3 million to give the total **scenario value of an EPZ of EUR 92.1 million.**

The indicative costs of efficient monitoring and enforcement, taken from the France model, is equivalent to EUR64.4/km2. Since the combined area of potential EPZs in the two countries is 280,218km2 then an indicative **cost of efficient control is EUR 18.03million**.

By relating this direct cost indicator to the protected benefit, meaning the potential pollution damage prevented, of EUR 87.1 million means that the **scenario incremental benefit is EUR 74.1 million.**

### 7.3.3 Straits of Sicily/Malta Scenario

The straits are one of the major transit passages of the world with tankers and container vessels crossing from the Atlantic to both Suez and the East and to the Black Sea oil and gas terminals.

The total passages through the area are estimated at some 90,617 per year of which 81% are tankers in transit across the Mediterranean (Appendix 3).

Applying the cost/value indicators from the EPZ model from France suggests that with 0.85% of passages resulting in pollution incidents then the potential annual number for the Straits of Sicily will be 770.

At an environmental cost of EUR 312,000/incident this leaves the scenario environmental cost at EUR 240.32 millions. With an effectiveness of 91% the **scenario value of EPZs is EUR218.69 million.**

The direct control costs for the 213,730km2 of EPZs, including territorial seas, at EUR 64.4/km2, provides an estimated **total cost of control of EUR 13.76 million**.

Consequently the scenario **EPZ incremental benefit is EUR204.93 million.**

### 7.3.4 The Adriatic

The number of passages of vessels greater than 100 DWT in the Adriatic based on the number of calls at major ports in 2010is over 20,953 passages (Appendix 3) of which 0.85% could end in pollution incidents then the number of such incidents would amount to 178. At EUR 312,000/incident the **environmental cost is EUR 55.5million.**

With the EPZ providing a 91% reduction then the **value of EPZs is EUR 50.5million**
.
With a potential sea area of 283,141km2 covering both territorial seas and EPZs/EEZs and a control indicator cost of EUR 64.4/km2 then indicative **direct control cost is EUR 18.23 millions**.

Thus the scenario **incremental benefit of an EPZ is EUR 32.5 million**.

### 7.3.5 Summary of Scenarios

Applying the same rationale to the other two scenarios (which have been done and will be included) provides the final picture given below (Table 21).

**Table 21 Summary of incremental benefits of EPZs in each scenario**

| Scenario | Environmental Cost EUR million | Incremental EPZ benefit EUR million |
|---|---|---|
| **France/Spain** | 101.2 | 87.1 |
| **Sicily Straits** | 240.3 | 204.9 |
| **Adriatic** | 55.6 | 32.5 |

All would benefit substantially from an EPZ with respect to control of vessel-related pollution. Comparatively, the countries around the Straits of Sicily would benefit a great deal from the full implementation of an EPZ largely because of the huge volume of transiting vessels, particularly oil and gas. Conversely the traffic in the Adriatic is least but even so, Croatia has deemed it worthwhile to create an EFPZ because of its dependence upon clean seas for its tourist industry. Therefore, as well as inherent value of ecosystem services assured by the EPZ and threatened by vessel pollution there are also direct values to be assessed from the economic activity of those dependant sectors.

## 7.4 The value of clean seas and an EPZ

### 7.4.1 Direct benefits

The value of EPZ plus value from the economic sectors which derive value from the clean seas together give an indication of the direct and indirect value of the ecosystem services being preserved together with the direct benefit their preservation supports. The ecosystem services being protected here by the EPZ are essentially similar to those being conserved within an MPA (Section 9.2.4) but they also include the natural breakdown of chronic pollutants such as oil, largely by micro-organisms, which prevents there accumulation and mitigated their potential damage. This in turn limits the potential damage done to dependent economic sectors such as tourism and fisheries.

The service value of the EPZ is given in the previous section. This is the cost that should be exacted to keep the seas clean in order to maintain the ecosystem services provided by the clean seas on the polluter pays principle.

One of the major economic sectors which derive direct benefits from clean seas is the tourist industry. In the Mediterranean clean seas provide amenities to support or add value to the

tourist industry. This is a direct benefit to the economy. The recent report by Plan Bleu (2010) has estimated that value for coastal States by determining by surveys and NUTS 3 statistics for some EU States, the proportion out tourism income representing the spend by tourists on transport (except international), food, accommodation and leisure services specifically in coastal regions. Given that tourism is a very competitive, fickle industry a simple indicative model might suggest that if tourists find that their children's feet are regularly covered with tar and oil or that owners of expensive vessels find themselves regularly sailing through oil slicks which they might also have to dive through, that this might affect their decision about holidaying around the coast of this particular region.

The recent Deepwater Horizon spill in the Gulf of Mexico had major impacts on tourism. Reports suggest that Alabama, for example, showed a 50% drop in coastal tourism where oil was washed ashore whilst over the Gulf States as a whole the drop was 35% on average, the same as was noted for the impact on tourism of the Exxon Valdez spill in Alaska some years before (US House of Representatives 2011)[246]. The loss was spread over catering, accommodation, leisure vessel hire amongst others[247]. This is a region, as with the coastal areas of the Mediterranean which is highly dependent on tourism. Particularly significant was the result of a marketing poll which reported that when asked whether they would still come to the coast if oil washed ashore on average 22% of holidaymakers responded negatively. This gives some indication of the proportion of tourism for which oil free beaches and seas are important[248].

These are all estimates based on a major event or accident with large scale acute pollution. The nature of pollution being dealt with here is the chronic, long term continuous discharges from passing vessels. However, without control this also manifest itself as tar on beaches and oil slicks at sea, not to mention less obvious contributions from hazardous waste which still account for more than 30% of discharges. Given that more than 20% of tourists are sensitive to this kind of pollution an assumption of 5% of revenue from the tourism sector could be at risk from chronic pollution is relatively conservative but will serve as an indicator of the potential cost if clean seas are not maintained and vessel pollution controlled within an EPZ.

Therefore assuming that the problem is sufficient to cause 5% of tourists to change their destination resulting in a 5% drop in tourist spending then this would be a reasonable measure of the tourist revenue supported by clean sea. Of course, if there is a major spill it could be much higher than this as indicated above but we are trying to examine the effect of uncontrolled, intentional chronic pollution of the sort the EPZ is enacted to eliminate and control.

Plan Bleu also identified two other sub sectors which are impacted by the amenity value of sea, these being the hotel and restaurant trade and the real estate business. In the former case, as pointed out by Plan Bleu (2010) there is a certain amount of double counting with the tourist sector since this also includes estimates for food and accommodation spending. For this reason the value added to the tourist sector alone will be used as an indicator to keep the model simple.

With respect to real estate, impacts on this are likely to be more complex and longer term since the behaviour of Investors and Householders in the face of pollution is likely to be

[246] http://www.hsdl.org/?view&did=20934

[247] http://www.crt.state.la.us/tourism/research/Documents/2010-11/OilSpilTourismImpacts20101215.pdf

[248] http://www.visitfloridablog.org/?p=1098

different and more complex than those of transitory tourists. So, again, only the benefits from tourism which are probably those most at risk from chronic pollution, will be included in the economic benefits for the present purposes.

Clean seas also support the fisheries and aquaculture industry. These can be very badly impacted in the case of a spill but the effects of long term low chronic pollution by hydrocarbons and other waste products is more difficult assess. The ultimate threshold effect is death of the fish which can be defined as the $LD_{50}$ this being the lethal concentration which causes the death of 50% of the fish population. At concentrations lower than this there may be some metabolic interference in growth and the production process but this is poorly known. Equally, exposure to lower doses of some hydrocarbons can be accumulated in the body which may interfere with metabolism, as just mentioned, but might also cause 'tainting' of the fish flesh thus rendering it unpalatable and unmarketable. However, these effects are poorly understood and there is no evidence that the current state of affairs is having these inhibitory effects. Consequently, the benefits of clean seas in supporting fisheries and aquaculture are discounted in the present model but should be borne in mind as part of the ultimate cost if the risks of a major incident are not minimised by controlling the polluters. By the nature of the incident, the costs will go beyond the economic into the social costs of lost livelihoods and severe damage to the ecosystem.

### 7.4.2 The economic benefits of clean seas assured by EPZ

Looking at the wider benefits that might accrue across the whole Mediterranean if all countries had the equivalent of an EPZ the principle indicator which can be used here is the value added to the tourist industry and the part of that value or benefit which is at risk from uncontrolled vessel pollution. An indicative proportion of 5% is taken as that part of the added value which might be at risk if vessel pollution is uncontrolled in terms of the percentage of the tourist spend which might decide to go elsewhere to ensure holidays in cleaner seas.

**Table 22 Clean seas and value added to tourism (data: Plan Bleu 2010)**

| Scenario | Coastal share of Tourism (%) | Protected Value added by coastal tourism (EUR millions) | Value Added by eco services (5%) (EUR millions) |
|---|---|---|---|
| **France/Spain** | | | |
| France | 20 | 4,394 | 220 |
| Spain | 70 | 1,626 | 836 |
| ***Total*** | | | ***1,056*** |
| | | | |
| **Adriatic** | | | |
| Italy * | 65 | 3,444 | 172.2 |
| Croatia | 72 | 2,653 | 132.7 |
| Montenegro | | 134 | 6.7 |
| Albania | 50 | 213 | 10.7 |
| Greece + | 95 | 633 | 31.7 |
| ***Total*** | | | ***356.4*** |
| | | | |
| **Straits of Sicily** | | | |
| Italy * | 65 | 4,592 | 229.6 |
| Malta | 100 | 377 | 18.9 |
| Tunisia | 95 | 1,009 | 50.5 |
| ***Total*** | | | ***299*** |

| | | | |
|---|---|---|---|
| **All Mediterranean countries** | 53 | 54,349 | ***2,718*** |

* the total for Italy has been allocated as 30% for the Adriatic coast and 40% for the southern Italy/Sicily coast.
+ The proportion of the Greece coast on the Adriatic is taken as 10% based on rounded values on proportion of coastline.

Plan Bleu (2010) was able to estimate the proportion of total tourist spend in each Mediterranean State which could be attributed to the presence of the sea and coast. Of the total tourist spending of EUR 196.6 billion annually across the Mediterranean States, an average of 53% was coastal. Of this Plan Bleu assumed that the value added from the sea and its amenity value was 50% of this coastal spend, bearing in mind not everyone specifically goes to the coast for the sea, some may frequent casinos for example. On this basis the total value added from the amenity value of the sea, as provided by its ecosystem services, is some EUR 54.35 billion annually. This estimate was done on a country by country basis which can now be applied to the scenarios in the present study (Table 22).

The value added by protection is in effect the benefit to the economy provided by an EPZ based upon the template provided by the experience of France. The totals are quite significant, indeed if the template were to be extrapolated over the whole Mediterranean then the economic benefit provided by the EPZ would amount to EUR 2.72 billion per year (Table 22) . This would represent the share of the tourism income assured by having control over oil pollution which would otherwise have a negative effect. However, the relative vulnerability of coastal States, that is the extent to which they would benefit from an EPZ, is more than just the total at risk. For example, France has assured a benefit of EUR 220 million per year compared to EUR133 million per year in Croatia; but in Croatia coastal tourism represents 72% of the tourist spend whilst in France it is only 20%. In addition, tourism is a higher proportion of the GDP than France and also it is in foreign exchange and hard currency. This would seem to justify Croatia in claiming an EPZ as part of its EFPZ. In this connection it is also worth noting that Tunisia with 95%, Malta with 100% and Greece with 95% are also very vulnerable and would likewise particularly benefit from the protection of an EPZ.

## 7.5 Total Costs and Benefits of an EPZ

In the previous sections it was mentioned that the value of the EPZ to clean seas can be expressed as the value of the EPZ in maintaining and protecting the fundamental ecosystem services together with the indirect potential impact on the local economy if the vessel pollution is uncontrolled. The direct value of the EPZ is in the value the State puts upon maintaining clean seas and their ecosystem services and their attendant amenity values, whilst the indirect value is the economic benefits which flow from the maintenance of those services, in this case indicated by the added value from tourism. These values can be regarded as a benefit in those countries with an EPZ and possibly a cost if the State is open to risk without an EPZ. Both direct and indirect values combine to show how big the overall gains can be by implementing EPZs across the scenarios.

In this way, taking the values from the EPZs in protecting services from Table 21 and the indirect values using the added value from tourism as an indicator from Table 22 , provides a view of the total benefits or potential gains by scenario if an EPZ were to be enacted shown in Table 23.

**Table 23 Total benefits from EPZs by scenario**

| Scenario | Incremental direct Benefit of EPZ (EUR million) | Indirect benefit Tourism VA (EUR million) | Total Benefits from EPZ (EUR million) |
|---|---|---|---|
| **France/Spain** | 87.1 | 1,893 | 1,980 |
| | | | |
| **Adriatic** | 32.5 | 366.4 | 399 |
| | | | |
| **Straits of Sicily/Malta** | 204.9 | 299 | 504 |
| | | | |

With regard to the direct incremental benefits of an EPZ it is clear that the Straits of Sicily/Malta would benefit to the highest extent by virtue of the amount of traffic passing through them. However, in terms of benefits to tourism that is the greatest to Spain leading to the highest total potential benefits in the France/Spain scenario. Even so, the proportionate benefits relating to the relative contribution of coastal tourism to the State economies referred to above must also be born in mind.

# 8 Cost benefit model – marine research[249]

## 8.1 Outline Approach

As outlined above, the establishment of EEZs or derivative zones may have a significant impact on marine scientific research. Currently, researchers from any State can conduct marine research anywhere on the high seas within the Mediterranean. If, for example, all States were to declare EEZs or derivative zones relating to proposed research activities, foreign researchers would need to seek permission to carry put research in the coastal State's waters, which may or may not be forthcoming. There could therefore be a cost in lost research opportunities and the simplest assumption to test this opportunity cost is to assume that all States will refuse such opportunities in order to establish a 'worst case' scenario.

Research here is taken as being public sector research where all data is put into the public domain for the public good. Private sector research is largely related to the development of an economic sector can therefore be considered as a cost within that sectoral development rather than a cost in its own right.

It is, however, worth re-emphasizing that the establishment of EEZs or derivative zones would only impact on research undertaken on the surface and in the water column as coastal States already enjoy jurisdiction over research on the sea bed as a result of the continental shelf regime. Thus it is important to emphasize that coastal State consent is already necessary for research on and below the seabed such as the case of oil and gas exploration.

A simple conceptual model is necessary to assess impacts on research opportunities in what are currently high seas areas. The Mediterranean Science Commission (CIESM) database contains a list with resources and means of all full service marine research institutions by country around the Mediterranean[250]. This enables an indicator to be raised for the value of the research capacity of each coastal States and the opportunity for marine scientific research in terms of the costs they contribute to this activity. This has been done for all the countries in the three scenarios developed (Appendix 5).

By separating research effort by territorial sea and offshore capability in EEZs (or derivative zones), based on the size of the vessels deployed, as offshore research work needs a sea going vessel, it is possible to derive an indication of the effort or capacity each country has with respect to research in its territorial sea and the putative EEZs. CIESM divides the database into those vessels below 12m (length overall) LOA, which can be regarded as coastal vessels, and those greater than 12m LOA which can be regarded as capable of undertaking outside the territorial sea. It also provides numbers of staff by scientist and support staff. By putting a value on the means of research enables some indication of the relative value States accord to marine scientific research.

To arrive at an overall value for research per scenario it is necessary to identify unit costs for staff and research vessels and to make the assumption that institutions with vessels of more than 12m LOA have the capacity to do research outside the territorial seas and thereby define the ability or opportunities of the institution to conduct wider research which may be in an area that could potentially fall within the EEZ of a third country. Thus institutions with

[249] *This model was prepared prior to the claims by France and Spain for full EEZs and does not take into account the impacts of such claims.*

[250] http://www.ciesm.org/online/institutes/IndexInstituts.htm

these larger vessels are taken as being those with the opportunity to undertake research in areas which are currently high seas (and susceptible to potential EEZ claims) while the remainder are mainly concerned with inshore research in the territorial seas. It is necessary to make such simplifying assumptions because there are already cases where research effort is being excluded or made difficult due political sensitivities so using the actual State of affairs, i.e. with and without EEZ, is not practicable. This is a method of assuming that if an institution has the means then, without EEZs or derivative zones, they would have the opportunity to research anywhere beyond territorial waters in areas which are currently subject to the regime of high seas.

## 8.2 Unit prices to assess research opportunities

To put a value on these opportunities requires some basic unit costs. With regard to research vessels, these are extremely expensive assets. In a recent report, the costs of 71 of the EU research fleet of vessels over 12m, which is around 65% of the total EU research vessel fleet, were analysed (MRAG 2009)[251]. The mean daily rate varied between EUR 8-13,000 but overall unit averages for a similar mix of vessels as those considered here were:

- average daily rate of operation of vessels >12m, EUR 11,900;
- average number of sea days per year, 202;
- therefore annual vessel cost is : EUR 2,403,800.

The average costs of smaller vessels <12m could not be estimated but estimates from MRAG experience in surveys have been arrived at and the average number of sea days amongst such EU vessels suggests that annual costs could average EUR 425,000. However, in the present case we are more concerned with the capacity for open sea research.

With regard to the costs of staff, taking a working average based on European civil service pay scales for middle ranking scientists and support staff suggests:

- a working annual value for midcareer scientist: EUR 44,800;
- annual estimate for support staff : EUR 32,000.

These unit prices can be used to monetarise the indicators of research opportunities for inshore and offshore research. This takes two forms:

- the total value of means deployed in each area which is a measure of the commitment, value or opportunity that a State has to research these zones, termed here the opportunity value;
- the difference between the capacity of the State to conduct research and it's opportunities if access to third country EEZs (or derivative zones) are denied which is the opportunity cost.

These are assessed for each scenario below.

## 8.3 Model of change in research access and opportunity costs

A simplified model for the purpose of estimating the opportunity cost for research is to compare a notional full 'high seas conditions' scenario, under which no Mediterranean State has claimed an EEZ or derivative zone meaning that all sea areas beyond the territorial seas

[251] https://webgate.ec.europa.eu/maritimeforum/node/502

are subject to the high seas regime in respect of which there are no limits on marine scientific research, with a 'worst case' scenario in which all Mediterranean States claim an EEZ and refuse consent to third country researchers. Under the second stage of this scenario each coastal State would be limited to undertaking marine scientific research within its own territorial sea and EEZ. Some states do conduct wide ranging marine research over the whole of the Mediterranean high seas area. For the sake of simplicity these activities are not accounted for in the specific scenarios being tested here but this could add further to any opportunity cost through potential loss of open access research opportunities.

This has been illustrated in the diagrams below. Figure 18 shows the 'high seas conditions' stage of the scenario situation, in which any State with appropriate means can undertake research anywhere on the high seas. The research efforts or opportunities to undertake research are thus evenly distributed over the full area of the high seas. Even those States like Country D could have arranged to have some research done beyond its territorial sea albeit by a neighbour. This is assuming that, since research here is taken as being public sector research, all data is put into the public domain for the public good.

If, under the second stage of the scenario, having declared EEZs (or derivative zones) all coastal State were to refuse access to third country researchers into these new EEZs then the only opportunity for a State to employ its open sea means of research (i.e. vessels capable of undertaking research beyond the territorial sea) would be in its own EEZ, a situation illustrated by Figure 19. Here the research opportunities per unit area are now very uneven. Some areas are now under-researched compared to the average effort deployed over the high seas in the first stage of the scenario. The extreme case is country D, which has no large research vessels able to undertake open water research and so the opportunities to undertake research in its EEZ have been lost. Essentially, if these lost opportunities under the second stage of the scenario, compared to the 'high seas' average under the first stage can be quantified for each State, then it is possible to estimate the opportunity loss due to the effect of the declaration of EEZs (and refusal of access) across the scenario.

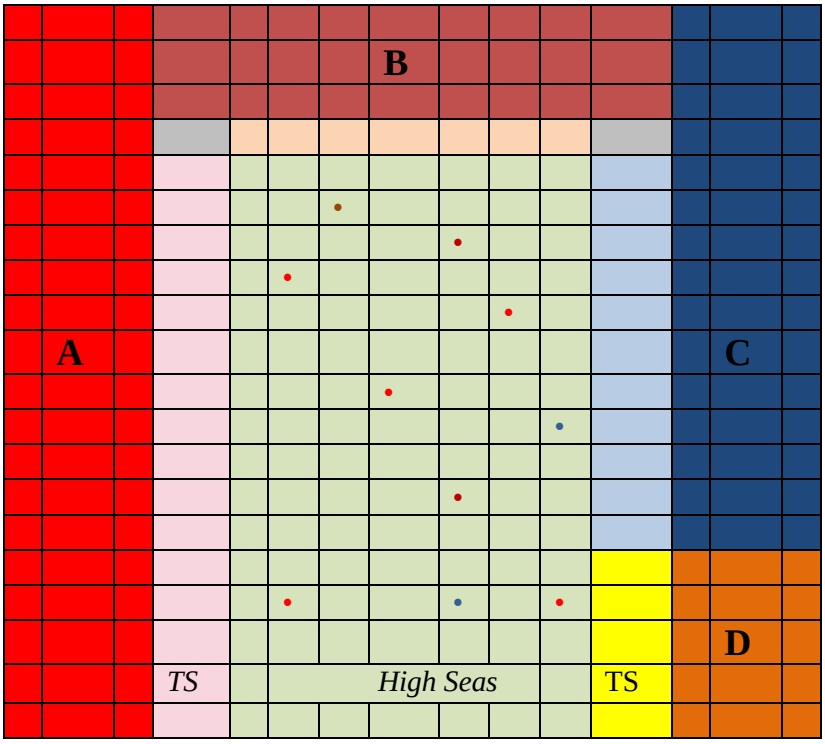


**Figure 18 Research model in 'high seas conditions' under the first stage of the scenario**

*Shows territories of countries A,B,C and D with their jurisdictional Territorial Seas in related colours. Grey square represents division between two countries. The deep water research means ie. vessels > 12m, for each country are indicated in colour coded dots with 5 for A, 2 for B, 3 for C and D with zero. The national research means can be spread anywhere on the high seas.*

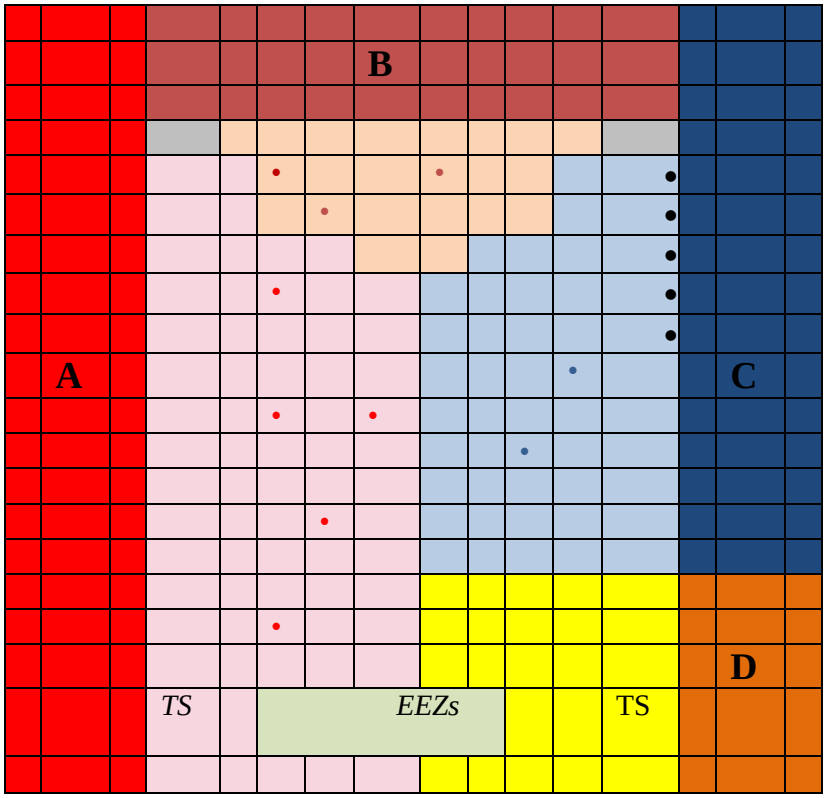



**Figure 19 Research model in EEZ and consent refusal conditions – the second stage of the scenario**

*The national means are confined to the jurisdictional area of their own EEZs. Some areas now are comparatively under researched, thus research opportunities are lost, with the extreme case of country D with no open water research means where virtually no research can be done under this model. The model goes on the monetarise these potential lost opportunities*.

In some cases where a State has plentiful means, for example country A in Figure 18 and Figure 19, the confinement of these means within that State's EEZ will intensify research effort in that area. However, this is not an opportunity gained since that was always an option under the high seas conditions, ie the first stage of the scenario.

## 8.4 Adriatic Scenario

### 8.4.1 Specifications of Scenario

The details of the research institutions and their means are extracted from Appendix 5 and summarised for this scenario in Table 24. Slovenia and Bosnia have been omitted from the analysis as per Section 5.2.2.

**Table 24 The recorded means of research for countries in the Adriatic**

| | FT Scientists | others | Vessels >12m | Vessels <12m |
|---|---|---|---|---|
| Croatia | 102 | 22 | 2 | 1 |
| Montenegro | 20 | 17 | | 1 |
| Albania | 14 | 40 | No record | 1 |
| Greece | 216 | 77 | 2 | |
| E. Italy | 177 | 118 | 7 | 5 |
| ***TOTAL*** | **555** | **284** | **11** | **10** |

The Italian EEZ has been sectionalised as discussed previously and the means of research are those located in east coast institutions. Similarly, the means of Greece have been based on research centres that have been active in the Ionian Sea.

From the detailed breakdown (Appendix 5) those institutes with vessels >12m LOA, along with their staff are totalled to give a measure of the capacity of the country to conduct open sea research. This capacity is then monetarised using the unit prices arrived at in Section 8.2.

### 8.4.2 Adriatic Cost Benefit model for Research

The sub totals for means of research from institutions with offshore capabilities in EEZs, as defined by the possession of a vessels of >12m LOA, and those with more inshore are derived and the unit costs above are applied can be derived from CIESM data in Appendix 5. Using the unit costs derived above (section 8.2) and applying to the Adriatic scenario gives the valuation for the research sector indicators which can be summarised as:

Total offshore means (EEZ) = EUR 37.7million
Total inshore means (TS) = EUR 15.1 million per year

This has been derived as exemplified in Appendix 5.
From Table 25 the total and relative indicator costs of the means of research in terms of the costs in EUR of offshore EEZ work (EEZ mill) and territorial sea (TS mill) can be summarised.

**Table 25 Matrix of total and relative EEZ research costs in Adriatic**

| Country | TS Km2 | EEZ Km2 | EEZ Research Effort EUR mill | EEZ Effort EUR/ Km2 | opp cost* EUR/km2 | opp cost Total EUR mill |
|---|---|---|---|---|---|---|
| **Italy** | 51526 | 127850 | 22.055 | 173 | -51 | -6.52 |
| **Croatia** | 31510 | 23848 | 6.9 | 289 | + | 0 |
| **Montenegro** | 2320 | 4093 | 0 | 0 | -224 | -0.92 |
| **Albania** | 6106 | 5098 | 0 | 0 | -224 | -1.14 |
| **Greece** | 22800 | 7754 | 11.02 | 1,421 | + | 0 |
| **TOTAL Km$^2$** | 114,498 | 168,643 | | | | |
| **Research cost EUR million** | 15.1 | 37.7 | | | | |
| **Value (EUR)/ Km$^2$** | 132 | **224** | | | | |
| **Total Opp Cost (mill)** | | | | | | **-8.58** |

*+ higher than open sea average of 224 EUR/km2 so no opportunity lost in this EEZ*
** cost of research opportunities lost*

An equal opportunity for open sea research under high seas conditions is obtained by dividing the total open sea capacities for the constituent countries by the total number of km2 in the high seas/EEZ. The average research capacity which can be brought to bear under high sea conditions is then equivalent to EUR 224/km2 (Table 25). Any reduction in this rate on a country by country basis indicated the opportunity cost of reduced research possibilities in this new EEZ. So that, for example in the case of Italy, where the monetarised research effort is equivalent to 173 EUR/Km2 when confined to its own waters (Table 275), the loss of opportunity compared to present communal research opportunities across the open seas over the same area in the Adriatic is EUR 224/km2 less EUR173/Km2 for this constricted effort which is EUR51/km2. The total loss is then given by multiplying this unit value by the number of km2 in the EEZ. This represents a monetarised indicator of the loss of research opportunities in the Italian EEZ if confined to its own waters, hence the value is negative in Table25. Where the intrinsic research effort is not available, as in Montenegro, then intrinsic research effort in an EEZ would be zero amounting to the loss of the possibility of the communal research effort of minus EUR224/km2.

Assessing potential indicative losses against this reference point for open access to research on the high seas of EUR224/km2, using the process just described, shows that opportunities to undertake research in Italian, Montenegrin and Albanian waters will be reduced if countries claim an EEZ and deny immediate access to other countries. This reduction in opportunity is represented by a loss of –EUR 8.58 million.

In those countries where confining their capacities to their own EEZ will intensify the capacity above the average, eg. Greece, this does not result in any increase in opportunity as mentioned previously.

Basically, this represents a system where those with more than the average means within the scenario can subsidise those with less than average means of research in the high seas EEZ region which will be denied if the countries retreat within their EEZs. This is significant because to do open sea research needs rather expensive means.

## 8.5 Gulf of Lions/NW Mediterranean

### 8.5.1 Specifications of scenario

The specifications are as per Section 5.2.1 with areas included are as per Table 5 with areas of all potential EEZs used. The details of the research institutions and their means are extracted from data list in Appendix 5 for this scenario and the procedures are the same as for the previous scenario.
A summary of the means for marine research is given in Table 26.

**Table 26 The recorded means of research for countries in the NW Mediterranean**

| | Scientists | Support | Vessels >12m | Vessels <12m |
|---|---|---|---|---|
| France | 387 | 245 | 3 | 13 |
| Spain | 729 | 324 | 8 | 16 |
| TOTAL | 1,116 | 569 | 11 | 29 |

From this the means available for open sea research have been derived for the scenario.

### 8.5.2 Gulf of Lions Research Cost Benefit model

The total indicator costs of the capacity for open sea research in terms of the costs in EUR of offshore high seas/EEZ work and territorial sea extracted from Table 26 to which the unit costs have been applied can be summarised as:

Total Offshore = EUR 83.49million
Total inshore = EUR 42.56 million per year

From this the relative opportunity can be calculated per $km^2$ of the zones in EUR per $km^2$ (Table 27).

**Table 27 Matrix of total and relative EEZ research costs in NW Mediterranean**

| **Country** | TS Km2 | EEZ Km2 | EEZ Research capacity EUR mill | EEZ capacity EUR/Km2 | opp cost* EUR/km2 | opp cost Total EUR Mill. |
|---|---|---|---|---|---|---|
| **Spain** | 55196 | 147020 | 48.52 | 330 | -11 | 1.617 |
| **France** | 24467 | 53535 | 19.87 | 371 | + | 0 |
| | | | | | | |
| **TOTAL $Km^2$** | 79663 | 200555 | | | | |
| **Research cost EUR million** | 39.29 | 68.39 | | | | |
| **value/ $Km^2$** | 493 | **341** | | | | |
| **Total Opp Cost (mill)** | | | | | | **-1.617** |

*+ higher than open sea average of 341 EUR/km2 so no loss in this EEZ*
** cost of research opportunities lost*

With these means at their disposal therefore, the coastal States could apply an average research capacity equivalent to EUR 341/$km^2$ in high seas areas. Applying the process

described for the previous scenario shows that Spain would be lower than the open access average of EUR341/km2 by EUR11/km2, if confined to its own EEZ and accounts for the overall loss of opportunities for open sea research.

## 8.6 Straits of Sicily/Malta Scenario

### 8.6.1 Specifications of scenario

The scenario includes the specifications in Section 5.2.1 and Table 5 and consequently the areas of potential EEZs of Tunisia and Malta and a southern section of that of Italy. The details of the research institutions and their means are extracted from the table in Appendix 5 to produce a summary of research means for this scenario (Table 28).

**Table 28 The recorded means of research for countries in the Straits of Sicily/Malta**

| | Scientists | Support | Vessels >12m | Vessels <12m |
|---|---|---|---|---|
| Southern Italy | 190 | 141 | 3 | 6 |
| Malta | 6 | 7 | | |
| Tunisia | 79 | 121 | 1 | |
| | 316 | 228 | 4 | 6 |

The sub totals for means of research from institutions with offshore capabilities in EEZs, as defined by the possession of a vessels of >12m, and those with more inshore are derived and the unit costs above are applied can be derived from as for previous scenarios. Using the unit costs derived above and applying to the scenario gives the valuation summary:

Total Offshore = EUR 22.79 million
Total inshore = EUR 10.29 million per year

### 8.6.2 Straits of Sicily/Malta Research cost benefit model

From Table 29 the total indicator costs of the means of research in terms of the costs in EUR of offshore EEZ work (EEZ mill) and territorial sea (TS mill) can be summarised which is the relative value of those opportunities. From this the relative opportunity can be calculated per km2 of the zones in EUR per $km^2$.

**Table 29 Matrix of total and relative EEZ research costs in Straits of Sicily/Malta**

| Country | TS Km2 | EEZ Km2 | EEZ Research capacity EUR mill | EEZ capacity EUR/Km2 | opp cost* EUR/km2 | opp cost Total EUR Mill. |
|---|---|---|---|---|---|---|
| **Italy** | 77289 | 127850 | 12.98 | 102 | + | 0 |
| **Malta** | 3990 | 44020 | | | -88.8 | -3.9 |
| **Tunisia** | 36880 | 41860 | 5.3 | 127 | + | 0 |
| **TOTAL Km$^2$** | 118159 | 213730 | | | | |
| **Research cost EUR million** | 10.29 | 18.9 | | | | |
| **value/ Km$^2$** | 87 | **88.8** | | | | |
| **Total Opp Cost (mill)** | | | | | | **-3.9** |

*+ higher than open sea average of 88.8 EUR/km2 so no loss in this EEZ*
** cost of research opportunities lost*

With these means at their disposal therefore, could apply an average research capacity equivalent to EUR 88.8/km2 in High Seas areas. Using the same process as the previous scenario, one country has no direct means of open sea research (i.e. no vessel) thus its EEZ would represent a lost research opportunity if countries restricted research within their EEZ.

## 8.7 Research and reality

### 8.7.1 The wider picture

The above sections have used indicators to arrive at a relative view of the opportunity costs of research over the Mediterranean and how these might change if EEZs were to be declared and consent for research denied. These are summarised below in Table 30.

**Table 30 Summary of research capacities and opportunity costs from scenarios**

| | Adriatic | Gulf of Lions | Sicily/Malta Straits | Total |
|---|---|---|---|---|
| EEZ Km2 | 168643 | 200555 | 213730 | 582928 |
| TS Km2 | 114498 | 79663 | 118159 | 312320 |
| Open Sea Research capacity (EUR/Km2) | 224 | 341 | 88.8 | |
| Total capacity EEZ EUR million | 37.7 | 68.39 | 22.79 | 134.88 |
| Opportunity Cost (EUR mill) | -8.58 | -1.62 | -3.9 | -14.1 |

From this table it appears that the opportunity cost of research retreating within EEZs would be - EUR 14.1 million taken from a total EEZ area in the three scenarios of 582,928 km$^2$ of the Mediterranean. Given that the total area of EEZs across the Mediterranean is 1,374,013 km$^2$ then on a pro rata basis the opportunity cost for the whole sea would be EUR 52.48 million. Bearing in mind that the actual cost of collecting maritime data across the whole EU public sector is EUR 929 million per year (MRAG 2009) then the opportunity cost is significant.

Using the mean relative intensity of opportunity for research, that is the availability of means per km$^2$, shows that the research in the open sea areas the opportunity or capacities in the Gulf of Lions, provided by France and Spain, is the highest at EUR 341/km2 respectively. The opportunities provided by their combined means is over three time that from the Straits of Sicily, for example (Table 30).

### 8.7.2 Collaboration and sovereignty

As explained initially, this situation is based on a hypothetical worst case scenario. There already exist a number of collaborative research programmes such as ADRIAMED and MEDITS in which coastal States pool their resources and their data. It might also be assumed that members of the EU would offer reciprocal research opportunities thus in the case of the France/Spain scenario above, ultimately there would be no net loss of opportunities since both belong to the EU. Even so, the above analysis does give pointers for research policy to coastal States that are considering whether or not to declare an EEZ or derivative zone. If a State has few means of research and/or such means provide a less than average coverage then such a State might need to think about concluding research agreements with neighbouring countries or increasing its own investment to purchase or charter an open water research vessel, all of which options have cost implications. WE can also see the unevenness of research capacity amongst the scenarios as described above so this also provides information for policy makers, particularly at the supra national level, on where open sea marine research capacity may need reinforcing.

Within the three scenarios used in this analysis there are already good examples of collaborative programmes and indications of the States prepared to cooperate. This, however, is not universally the case. There are a number of cases reported in stakeholder interviews of certain countries, including Egypt and Tunisia, withholding or delaying permission for research surveys recently. Even in the MEDITS programme the trawl transects from eastern Italy end at the boundary of the claimed Croatia EFPZ (Figure 20). This collaboration is not a given.

This relates to a further problem of research and the potential loss of opportunities with the adoption of EEZs. Some coastal States with larger research vessels and various international groups have, from time to time, organised or certainly have the capacity to conduct Mediterranean-wide research surveys. France and Spain both fall into this category in the analytical scenarios above. A good case in point is the whale surveys carries out by the International Animal Welfare (IFAW) between 2003 and 2007 (Figure 20)[252]. Already some coastal waters are not included but such surveys would become much more difficult, and therefore, costly to organise with EEZs whilst some permissions may be withheld.

252

http://www.ifaw.org/Publications/Program_Publications/Whales/asset_upload_file347_51780.pdfpdf

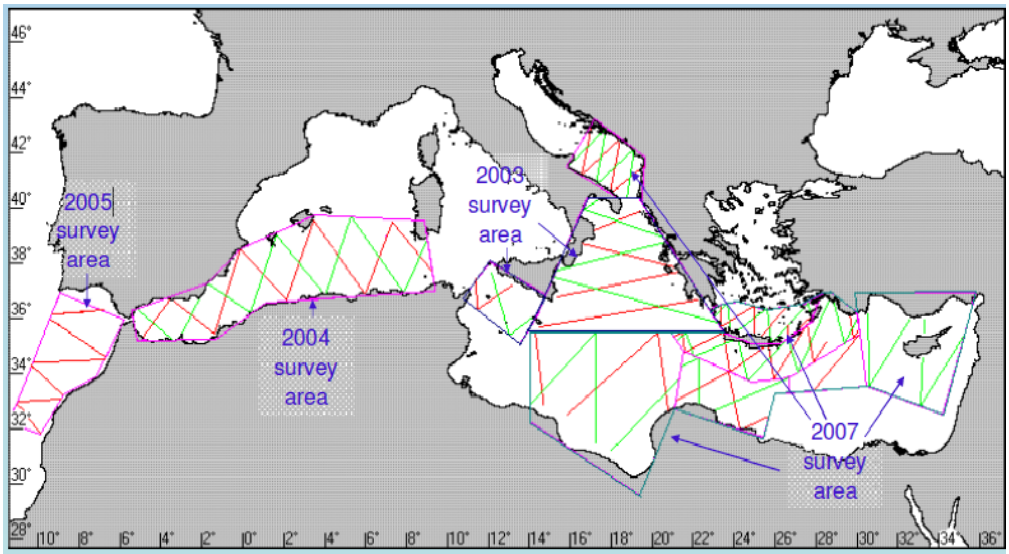



**Figure 20 IFAW cetacean surveys of 2003-07. Source: IFAW**

The opportunity cost of potential loss of research opportunities across the Mediterranean suggested by the EUR 52.5 million estimated above would not include this wider international dimension.

The potential for EEZs to strengthen coastal State control over marine scientific research is also relevant of course to research undertaken by third party non-Mediterranean States. In interviews with stakeholders it emerged that the NOAA has licensed experiments to test impacts of military noise on whales specifically in the Pelagos Sanctuary, which they can do since most of it lies within the high seas. This issue is dealt with in more detail in the next section (Section 8.4).

Another institution with a wide-ranging remit for marine research is the Office of Naval Research (ONR) which coordinates, executes and promotes the science and technology programs of the United States Navy and Marine Corps. The basic task of the ONR is of ensuring safety of the US fleet on a global basis. Some of the argo floats referred to below are part of the Integrated Ocean Observing System are funded by ONR and a number of European research institutes have consequently received from funding from the ONR. They have a considerable interest in the Mediterranean in support of the US 6$^{th}$ Fleet and its activities. Such a non-Mediterranean institution is able to conduct research across the high seas of the Mediterranean, using many of the sophisticated techniques referred to below, which may not necessarily be for the benefit of the coastal States and with no obligation to share data with them. Such activities would be under much greater control, or at least subject to bilateral agreements, if EEZs or relevant derivative zones were instigated

### 8.7.3 The anomalies of research

Up to this point the discussion has focussed largely on vessel related research but other research methods are widely used and may also be impacted by the establishment of EEZs or derivative zones.

#### *8.7.3.1 'Ships of opportunity'*

A major component of marine monitoring systems is the use of 'ships of opportunity'. These are usually commercial vessels such as bulk carriers and ferries, particularly those with a regular schedule, for which agreement has been reached with the owner companies that they should tow behind some kind of monitoring device or have it attached to the hull. This is an excellent way of obtaining systematic data on physical, chemical and biological parameters along regular transects. Some ferries crossing form the north to the south of the Mediterranean are used regularly for this purpose. However, even under the present circumstance, the sensor must be pulled on-board or turned off when entering the territorial sea of certain countries. Thus with EEZs, the permission of all countries with transit waters would have to be obtained before the practice could be continued yet this is extremely valuable data for the whole region.

#### *8.7.3.2 Automatic monitoring floats and buoys*

The Expendable Bathythermograph (XBT) has been used by oceanographers for many years to obtain information on the temperature structure of the ocean to depths of up to 1500 meters. The XBT is a probe which is dropped from a ship and measures the temperature as it falls through the water. Two very small wires transmit the temperature data to the ship where it is recorded for later analysis. The probe is designed to fall at a known rate, so that the depth of the probe can be inferred from the time since it was launched. It also has a GPS. By plotting temperature as a function of depth, the scientists can get a picture of the temperature profile of the water. http://www.aoml.noaa.gov/goos/uot/xbt-what-is-figs.phpOn many projects it is necessary to deploy XBTs on a 24 hour schedule as the ship steams along its course. It is sometimes employed with a ship of opportunity as well as by research vessels.

Clearly though this is a form of marine scientific research and thus, depending where a probe is dropped, a coastal State's consent may be necessary. There is, however, a further dimension in that whilst the XBT may not be designed to undertake research on the sea bed, it does end up there. This then impinges upon the continental shelf jurisdiction that the States already have so already there is an issue.

The XBTs are being replaced by what are termed Argo floats. The Argo floats are released at some point on the open sea following which they drift at a fixed pressure (usually around 1,000 metres depth) for 10 days. After this period, within the relatively short time of around two hours, the floats move to a profiling pressure (usually 2,000 metres deep) then rise, collecting instantaneous profiles of pressure, temperature, and salinity data on their way to the surface. Once at the surface, the floats remain there for under a day, transmitting the data collected via a satellite link back to a ground station and allowing the satellite to determine their surface drift. The floats then sink again and repeat their mission. There is no control on where they end up. Thus for example French researchers might launch one within the French EPZ but once beyond others could remove or destroy them or use them to create a diplomatic incident. They tend to be deployed for deep water research and are in use in the Mediterranean. Unlike the XBT which are essentially dumped, the argos floats can function for some time but when they do wash up they sometimes do cause incidents as they have battery packs and warnings on the side and look like an unexploded bomb.

Argo is a component of the Integrated Ocean Observing System, which is a collaboration between 50 research and operational agencies from 31 countries with the United States contributing over half the total funding[253]. By no means all Mediterranean States belong to

[253] Integrated Ocean Observing System

this programme and the prospect of these unguided bodies drifting through new EEZs of non-compliant countries could create problems of both a legal and diplomatic nature.

#### *8.7.3.3 ROVs and gliders*

A Remotely Operated underwater Vehicle (ROV) is an unmanned, highly manoeuvrable submersible that is attached to a vessel and operated by a person aboard that vessel. The ROV is linked to the vessel by a tether which is a group of cables that carry electrical power, video and data signals back and forth between the operator and the vehicle. Most ROVs are equipped with at least a video camera and lights. Additional equipment is commonly added to expand the vehicle's capabilities. These may include sonar, a still camera, a manipulator or cutting arm, water samplers, and instruments that measure water clarity, light penetration and temperature. As such they are very powerful tools in conducting deep water marine research.

At present ROVs can clearly be freely used in the high seas areas of the Mediterranean but there has been some concern that they may also provide samples and information from the sea bed on minerals and organisms of pharmaceutical interest, all of which currently falls within the continental shelf regime. However, most of the research doesn't actually make contact but just hovers and roves over the seabed. There tend be traces of underlying mineral or organisms in the water column and so the ROV can collect samples from just above the seabed rather than from the seabed directly. A lot of the studies are done with ROVs that go a metre above the seabed in fact contact is avoided because the ROV could be damaged. Whether or not this technically constitutes scientific research on the continental shelf which would require coastal State consent, given that there is no contact, the fact remains that in the event that an EEZ or derivative zone is established the question becomes moot as coastal State consent would in any case be needed.

A related method is the use of remote vessels including Autonomous Underwater Vessel (AUV) and so-called Gliders. Whereas ROVs are on a cable from a research vessel and are controlled through the cable an AUV is literally a mini submarine and completely autonomous. They are pre-programmed to descend, travel send data according to the programmed co-ordinates. Gliders are essentially much smaller versions which tend to be used in coastal waters although they are also employed beyond the territorial seas. Currently there is no problem with employing them on the high seas but with EEZs they would be more restricted and would need to be programmed not to enter the territorial waters without permission.

Indeed this is the case for all of the methods outlined in this section. They can currently be used freely in the high seas regions of the Mediterranean but would be subject to much more restrictions within an EEZ. There may well be States that would not provide permission and thus further research opportunities would be lost.

On the other hand States would have much greater control over research conducted over their continental shelves. As discussed elsewhere above without sampling the seabed sampling or prospecting for new resources is already possible without permission. This is particularly the case with new micro-organisms and enzyme systems that may be isolated elsewhere and used in pharmaceuticals or industrial processes. It is not so much a question of the actual organisms taken but rather the intellectual property rights (IPR) that may be derived from research on such samples that from the coastal State's perspective should be subject to an agreement with the sampler and isolator thereby ensuing that such a State benefits from IPR so generated. An EEZ would give more rights and closer supervision by the coastal State over use and discoveries relating to its own resources.

Providing States make proper agreements for such exploration rather than just having a national scientist on board for a joint publication, agreements which pay attention to potential royalties through maintaining IPR or use of economically important data, then there could be financial benefits from this increased control. For an industrially or pharmaceutically useful biochemical system the rewards could be high although there are no examples in the region at the moment. There has, however, been interest from US groups recently in conducting this type of research in the Mediterranean as part of a wider deep water prospecting activity that is shared in other ocean with Russia and China in particular.

A final issue for Mediterranean research is the issue of natural disasters. The overriding consideration here is the capability to monitor the sea bed for seismic activity. There are currently a number of seabed stations deployed and more are planned. The region needs to have the ability to monitor for seismic hazards across the basins and must make sure not to have artificial barriers, such as may be created by EEZs, in the way of this.

# 9 Cost benefit model – open sea MPA and conservation[254]

## 9.1 Introduction

To date conservation efforts in the Mediterranean have generally been focussed upon the territorial seas of the coastal States. Indeed with one exception, all MPAS are located in and landward of territorial seas. A key finding of section five of this study is that the establishment of EEZs or relevant derivative zones[255] has significant implications for conservation in areas that currently form part of the high seas largely through giving the coastal States that make such claims more control. For EU Member States opportunities for improved control, however, will be accompanied by greater responsibilities in terms of key EU policies in particular the Habitats Directive and the Marine Strategy Framework Directive. These implications are examined in more detail below.

Placing costs and values on conservation is notoriously difficult. Values can refer to the services that the ecosystem provides to a region or the direct impacts such services might have on regional economies. Nevertheless, cost benefit approaches have been used to assess conservation in some cases (IUCN 1998)[256]. These have generally revolved around protected areas since these are probably the most concrete type of examples for this approach. In the context of the present study, there are no barriers to countries setting up MPAs in their territorial seas and the real question hinges around the setting up of MPAs in what are currently high seas areas. Of this, there are two aspects. First, the setting up of a high seas MPA represents the addition of a new zone in the Mediterranean in its own right. Second there is the question of whether or not the establishment of such a zone would be impacted by an expansion of legal rights under an EEZ or derivative zone. Creating a simple cost benefit model will enable us to examine theses cases whilst also looking at the overall value of conservation in the open water regions of the Mediterranean.

Having stated above that MPAs in the Mediterranean are confined to the Territorial Seas, the one exception is the Pelagos Sanctuary for the conservation of cetaceans. This is the largest conservation area in the Mediterranean and is the product of collaboration between three states – France, Monaco and Italy. It lies in a quadrant focussed on Corsica with boundaries extending to the mainland of France and Italy and encompassing Monaco. As such it provides a most valuable template for the construction of the model for high seas MPAs.

More specifically the indicators from this template can be applied to theoretical MPAS that might be set up in the Mediterranean. However, rather than being totally theoretical the examples used are taken from high sea MPAS currently being planned by RAC/SPAR and ACCOBAMS[257]. Of these planned MPAs the most relevant are those envisaged that relate to the scenario areas namely the MPAs planned for the Northern Straits of Sicily and the North-eastern Ionian Sea have. It is envisaged that these and all of the other planned high seas MPAs will be SPAMIs under the Barcelona Convention.

[254] *This model was prepared prior to the claims by France and Spain for full EEZs and does not take into account the impacts of such claims.*
[255] Ie a derivative zone with an appropriate conservation focus such as an EPZ.
[256] *Economic values of protected areas: guidelines for protected area managers.* Taskforce on Economic Benefits of Protected Areas of the WCPA. IUCN Gland and Cambridge, 52pp
[257] Web site and planned high seas MPAs: http://www.rac-spa.org/node/597

## 9.2 A Cost Benefit model of a High Seas MPA - the Pelagos Sanctuary template

### 9.2.1 The background

The Pelagos Sanctuary is believed to be the first example of a high seas MPA and thus merits detailed analysis to the extent that it may offer an alternative to EEZs or derivative zones such as ecological protection zones as a means of ensuring the protection of marine biodiversity.

The core of the Sanctuary extends over 87.500 $km^2$ in the north-western Mediterranean Sea between Italy, France and the island of Sardinia (Figure 5) but with the surrounding area covers almost 2.5 million $km^2$. The area encompasses Corsica and the Archipelago Toscano.

The initial catalyst was the awareness that many whales were becoming accidentally entangled in the nets of tuna drift net fishermen leading to an international outcry from NGOs and other bodies and even diplomatic pressure from the US Government to end the fishing. The Italian courts agreed by 1990 to the dismay of the fishermen.

In 1990 the French Ministry of Merchant Marine proclaimed a triangle of water from the tip of Corsica which was declared off limits to drift net fishing and the Tethys Research Institute proposes a project called 'Project Pelagos' for the establishment of a marine protected area in the high seas encompassing the most important habitat for cetaceans in the region. Because of its ecological richness and representativeness, its high species diversity, its intense biological activity, the presence of critical habitat for a number of diverse pelagic species including cetaceans and its opportunities for baseline research, education and development.

The proposal challenged the mainstream legal notion of the time that establishing a protected area in the high seas was impossible and generated an awareness that new mechanisms were required to deal with high sea conservation. For this reason it is worthwhile to follow the step by step process by which the sanctuary was established (Van Klaveren 2007)[258]. At the same time there was an awareness that any solution should endeavour to integrate conservation with human activity.

Project Pelagos gained the support of the Rotary Clubs of Milan, Monaco and Saint Tropez and in 1991, Prince Rainier III of Monaco granted the support of the Principality for the project and recommended that a sanctuary for cetaceans should be eventually created in the Ligurian-Corsican-Provençal basin through a trilateral agreement amongst France, Italy and Monaco. In 1993,the ministers of the environment of France, Italy and the Principality of Monaco signed a joint declaration for the intention of setting up an institution of a Mediterranean Sanctuary for the protection and conservation of marine mammals. At this point, however, the political will began to wane and a number of difficulties arose.

However, in 1999 the idea was revitalised and the ministers of Italy, France and the Principality of Monaco signed the final agreement which was subsequently ratified in 2002 and the Sanctuary Agreement entered into force.

[258] Van Klaveren, P. et al (2007). PELAGOS: a step by step approach for Mediterranean high seas 'spatial and species oriented' conservation. ICEF, Venice, 24-26 May 2007.

In 2001 the Pelagos Sanctuary also became a SPAMI under the Barcelona Convention so the Sanctuary is both subject to a tri-partite agreement and being a SPAMI. By this time the original catalyst for the creation of the area, the drift netting for tuna, had been banned in the region. There is an element in the agreement which stets that if any new fishing method appears, such as for krill upon which the whales feed, then this shall go to arbitration via GFCM or ICCAT.

The term sanctuary has been used following the precedent set by NOAA. It reflects the fact that the whales are ultimately part of a migratory population which cannot be entirely protected by a single area but at least for part of their life history they will have a refuge.

It has been suggested that creation of a transboundary SPAMI is a more cost effective way of achieving a protected area rather than by a formal agreement. However a countervailing view is that tripartite negotiations would be needed to achieve a transboundary SPAMI which would effectively end in an agreement.

In 2007 the GFCM considered that the Pelagos Sanctuary was, 'An experiment in the ecosystem approach to management'.

Following the ratification of the agreement the structures of the Sanctuary have been set up. Even so this was not without its institutional problems. In the initial draft agreement France wanted a simple statement of intent so that it could be ratified quickly by their government but Italy had to have the budgetary provisions in which lead to a 2-3 year ratification process. At a meeting of the parties in 2005 it was agreed that Italy would host the headquarters in Genoa, that the executive secretary would be French national, and that the chairing of the scientific and technical committee would be the responsibility of the Principality of Monaco. The main bodies of the Sanctuary are: the Permanent Secretariat, the three National Steering Committees, the Technical-Scientific Committee and the National Focal Points.

The working budget is around EUR 126,000 per year, of which EUR 100,000 is salaries. The contributions are France and Italy 45% each and Monaco 10%. There is a small amount of money available for small research projects. However, considerable research funds have been attracted to the sanctuary from other sources.

Thus after 20 years the Sanctuary, although established in law is still not fully functional. However, it is important to appreciate that the problems are largely institutional and so far as regards implementation are not inherently related to the high sea element of the problem. On the other hand basic enforcement issues remain.

### 9.2.2 Negotiation or Transaction Costs

The most immediate costs of an MPA relate to setting it up and then managing it.

As the Pelagos Sanctuary shows, the main cost of setting up the MPA is the negotiations amongst the partners and stakeholders essentially, therefore, the transaction cost. To estimate the costs requires some framework for the negotiations. In the Pelagos Sanctuary, even 20 years after it was first conceived, it is not fully functional although the agreements are in place and it also has SPAMI status, but it's problems are not to do with its high seas status and will be returned to later. Probably the most appropriate framework in that used by ACCOBAMS and RAC/SPAR for Special Protected Areas of Mediterranean Interest (SPAMIs) under the Barcelona Convention (M-C Grillo pers. comm.).

This is a stepwise process which can be summarised below:

- Internal meetings of the participating States prepare the national concepts which may involve national committees and Ministry approvals;
- the concepts are presented to the committee for SPAMIs in RAC/SPAR in Tunisia by national representatives and their technical advisers;
- Further work at national level;
- Final framework presented to focal groups of the Mediterranean Action Plan (MAP), which has overarching responsibility for implementing the Barcelona Convention, in Athens;
- Management Plans drawn up for the MPA by National Committees, often using consultants.

The process does not have a single definable budget but is mainly carried out by government employees implementing their national policies on conservation, often amongst other responsibilities. The best way of estimating a cost is therefore to use project planning experience to estimate the number of working days at each stage in relation to an average daily cost.

That average daily cost is taken from a middle ranking civil service salary of EUR 40,000 per year divided by the average number of working days per year of 223. The actual level of salary will vary from country to country but we are trying to assess the commitment of each participating State to the value of conservation which is not a function of GDP hence a standard rate or value is used. That standard rate amounts to **EUR 180 per day**.

For consultants used to devise the management plan, this is likely to be higher but we will assume that independent consultants are used rather than a company. In this case a reasonable working rate would be **EUR 450 per day**.

On this basis, the negotiation costs per participating country are indicated in Table 31

**Table 31 Project costs of negotiating SPAMI per country**

| Action | Days | Rate (EUR) | Total (EUR) |
|---|---|---|---|
| National concept | 90 | 180 | 16,200 |
| Presented as SPAMI* | 45 | 180 | 8,100 |
| Further work | 75 | 180 | 13,500 |
| Presentation to MAP | 45 | 180 | 8,100 |
| Management Plan | 30 | 180 | 5,400 |
| Consultants for MP | 40 | 450 | 18,000 |
| Final approval | 15 | 180 | 2700 |
| **Staff sub Total** | **340** | | **72,000** |
| 10% contingency | 34 | 180 | 6120 |
| **Days Final Total** | **374** | | **78,120** |
| Other costs + | | | 17,186 |
| **TOTAL** | | | **95,306** |

** includes time of Committee and Secretariat members*
*+ Other Costs represent travel and consumables – a working average is 22% cost of personnel time*

A time contingency of 10% is allowed in the estimate and the prime movers regard three years as an average duration for the process but, of course both elements can be surpassed if negotiations are not straightforward. The political will on the part of the partners is over-riding. There is also no allowance for the inclusion of other stakeholders such as the IMO, if change of shipping routes is required, or international agencies such as WWF or IUCN. The estimated cost of the set up of a high seas MPA within the SPAMI system is a rounded **EUR 95,300 per country.**

### 9.2.3 Operational Costs

Once established by the above process the MPA needs to be operated and managed. With it being a partnership of countries there is likely to be a secretariat or management group jointly supported and/or staffed by the partners. In the case of the Pelagos Sanctuary as part of the agreement the three countries provide an annual budget of EUR 136,000 and an office in Genoa where the salaried General Secretary should work. Other positions and membership of the Working Groups are voluntary.

In addition, France and Italy are reported to provide additional funds which are said to be from their Natura 2000 allocation from the EU and France also administers and manages its section via the Agence des Aires Protegées based regionally at Toulon and the National Park at Port Cros.

The annual budget must therefore be of the order of EUR 136,000 plus perhaps an equivalent in voluntary matching funds from the partners, therefore **in the region of EUR 280,000 per year.**

This could be used as a unit price from a high seas MPA but there is more probably an area component. Thus, with the area of the Pelagos Sanctuary being 87,500 km2 then an indicative rate to apply to the model for **operational costs** would be **EUR 3.2 /km2**.

It should be borne in mind that the Pelagos Sanctuary is principally for cetaceans so control objectives are limited but, even so, the management requirements for a high sea MPA are likely to be less complex and extensive compared to a coastal MPA with rich habitats. Even so, much of the Pelagos Sanctuary is covered by the CROSSMed surveillance system within the France EPZ (also extends a little into Italian waters) and to that extent is receiving protection from vessel based pollution (Section 7).

### 9.2.4 Conservation Value and Benefits of a High Seas MPA

As mentioned above the value of conservation is probably one of the least tangible to evaluate. Never the less progress in environmental economics over the last twenty year has developed an array of possibilities (IUCN 1998, TEEB 2010). Recently Plan Bleu, one of the Regional Activity Centres under the UNEP/MAP programme for the Barcelona Convention explored these possibilities and arrived at an array of parameters which give an indication of the contribution of the Open Sea, amongst others, to the ecosystem services upon which the various economic sectors depend (Plan Bleu 2010)[259]. It is in the preservation of these services that conservation underpins economics and it is these services which give conservation its primary value.

A summary of the types of ecosystem services to be expected and their categorisation for the Open Sea ecosystem is given in Table 32

**Table 32 Summary of potential marine ecosystem services and their nature in the Open Sea ecosystem (Plan Bleu 2010)**

[259] Mangos, A., Bassino, J-P and Sauzade, D (2010). *La valeur économique des benefices soutenable provenant des ecosystems marins mediterraneens*. Plan Bleu, UNEP/MAP, Sophia Antipolis, 78pp.

| **Extraction function** | | | | **Regulatory function** | | | | **Cultural and recreational function** | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of ecoFood production Unrenewable resources production Genetic and biochemical resources production | | | Renewable energy resources production | Air quality regulation Global climate regulation Mitigation of natural hazards | | | Waste treatment | Amenities Support to recreational activities Support to cultural and spiritual activities | | |
| Open sea Habitat for fisheries resources | [Oil drilling (*)] | Deep-lying habitat genetic resources? | Swell? | ? | $CO_2$ sequestration in water and sediment + rainfall from evaporation | ? | to the absorption of organic discharge and to the dilution of other discharges | coastal landscape + presence of a specific biocenosis + affects local climate (sea breeze…) | Yachting, cruising, Whale watching, Water sports… | ? |

***** not relevant to marine ecosystems

Each of the above services provided by the open sea ecosystem can be examined for a potential indicator value.

*Habitat to support fishery resources*
Taking into account the proportion of catches taken in open water systems in the Mediterranean and the value of those benefits Plan Bleu (2010) estimate that value of benefits from the open sea ecosystem (defined as sea of greater than 100m depth) and habitats for those fisheries provides a production equivalent to 0.3 t/km2 and a value of benefits of **EUR 1,050/km2.**

*Non renewable resources*
In terms of ecosystem services the production of raw materials is generally regarded as not being a benefit since it is the result of a non-sustainable use based on extraction. Particularly in the case of oil and gas coming from below the sea bed and therefore cannot be regarded as any part of the marine ecosystem.

*Genetic resources*
There is considerable interest in the possibilities offered in harnessing the genetic resources of marine bacteria and other organisms in the Mediterranean at the moment (CIESM 2010)[260]. The Mediterranean has a number of deep sea extreme habitats including hypersaline and thermal vents many of which have evolved their own flora of tolerant bacteria. Collecting such bacteria allows enzymes with unusual properties to be isolated which may function at higher temperatures than normal or to break down unusual substrates. Such enzymes are much in demand in the cosmetics and pharmaceutical industries or could help in the breakdown and dispersal of oil, amongst others uses.

However, the state of biotechnology has advanced to the point that once such an enzyme has been identified it is possible to isolate the gene responsible which can then be patented and used for commercial production of the enzyme. The yield of one successful patent could result in the generation of millions of Euros which would be a value resulting from the use of the deep sea marine ecosystem services. It is difficult to put any estimate on the economic benefit of such a future development at this point but it should be borne in mind that it could be considerable.

[260] CIESM (2010). New partnerships for Blue Biotechnology development. Ed. Briand F., Report on CIESM workshop, Monaco, 11-12 November 2010. 30pp.

There is a further aspect to the use of genetic resources. At the moment any country in the world can send a research ship into the high seas areas of the Mediterranean to do water sampling including in the deep sea areas where these extreme habitats are found. Theoretically, foreign vessels cannot sample the sea bed directly since this would breach the rights of the State whose continental shelf it was. However, as described above, there are sophisticated devices such as submersibles which can sample just above the bed and still obtain appropriate samples. Such vessels may be carrying out a wide range of oceanic research projects and may be hosting and sharing this data with the coastal State but the bacterial samples could be taken back to the home laboratory of the research vessel elsewhere in the world where the genetic analysis can take place. It is then this laboratory which can file the patent without acknowledging the original provenance or property rights (Briand pers. com.). This can be much more closely controlled by the coastal States if they have jurisdiction unlike the existing high seas system and the coastal State can claim the property rights.

*Renewable energy*
The only potential for open water systems would be to use the swell for wave power since there is a very small tidal range in the Mediterranean. This, however, is so far in the future that, again, it should be born in mind as a possibility but cannot be used as an indicator at the moment (considered further in Section 13).

*Global climate regulation*
Amongst the regulatory functions the open sea can only really contribute through its impact on climate regulation through CO2 sequestration. The seas are a major sink for the removal of CO2 from the atmosphere through its tendency to be dissolved at the surface and used by phytoplankton in photosynthesis thus fixing it.

For the Mediterranean, the capacity for sequestering CO2 from anthropogenic sources in the atmosphere has been put at 11.8t/km2/year (Huertas 2009)[261] . This is almost twice the global marine average but represents only 5% of the CO2 emissions of the coastal Mediterranean States. Never the less it provides a basis for a valuation since Europe has a carbon quota trading system in place which gives carbon a value. At the moment in 2011, the European Energy Exchange has the price of carbon at EUR 11.5 per tonne thus at the above rate of sequestration this indicates a value for the carbon sequestration service of the open sea as **EUR 136 / km2.**

*Waste treatment*
The coastal waters bear the brunt of waste coming from the land and from towns. The open sea has the major issue from vessel related pollution and discharges which are often illegal. Values for this service have been discussed to the previous section and are best dealt with in the environmental pollution sector (Section 6). Never the less it should be borne in mind that the open sea ecosystem makes a direct contribution in gradually breaking down the oil and other waste from the chronic continual discharges from vessels otherwise they would accumulate indefinitely.

*Cultural and recreational*
For open waters those activities which are water based are most relevant such as whale watching, yachting and cruising (Table 332). Of these, in the context of conservation, whale watching and related ecotourism is most relevant. Again, aspects of the use of tourism as an indicator of ecosystem services have been explored as in the section on environmental pollution (Section 7.4.2).

[261] Huertas, I.E. et al. (2009). *Anthropogenic and natural CO2 exchange through the Strait of Gibralta*r. Biogeosciences 6: 647-662.

To look at the tourism indicator in respect of the value of conservation the most relevant reference case id that of PELAGOS, bearing in mind these indicator values are to be used in relation to setting up high seas MPAs within the scenarios.

### 9.2.5 Economic Benefits of a conservation area

The direct benefits referred to above are related to the value of ecosystem services provided by the conservation of the seas. As an indirect consequence of conservation there may be some direct economic value although this is not the primary reason why conservation is carried out. Never the less, this economic value can go some way towards 'cost recovery' of the direct setting up and operation of the conservation area. A common source of this economic benefit is tourism which creates the amenity value provided by ecosystem services.

Conservation is often associated with the creation of a protected area. The creation of a park puts the area on the map which in turn can attract tourists. For example, it is estimated that since the initiation of the Pelagos Sanctuary, the number of tour operators offering whale watching tours has increased from 20-30 to 50-60 (P Robert pers comm.) in Italy and France (Figure 21) with many of them using Pelagos Sanctuary literature in their PR material.

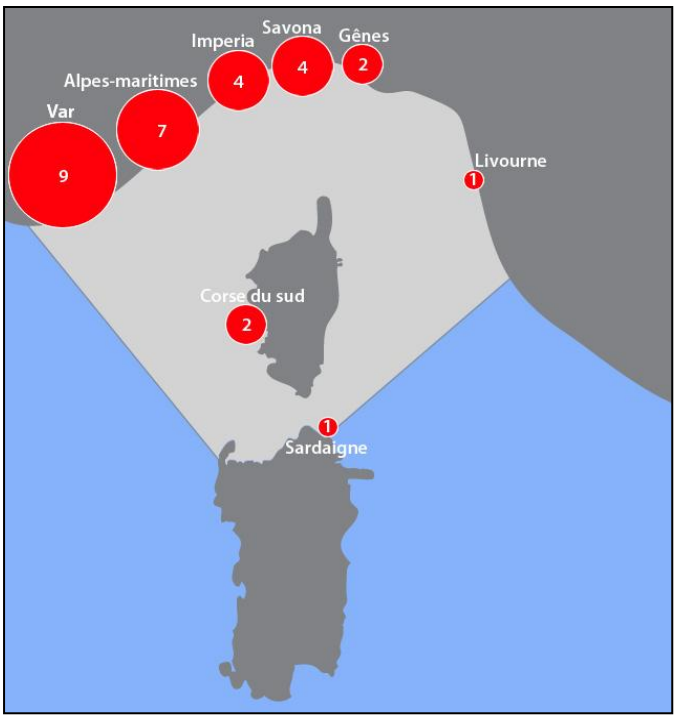



**Figure 21 Number of sites of commercial operators in Sanctuary 2007**

Surveys have shown (Van Klaveren et al 2007) that in recent times, since the declaration of the Sanctuary in 1998, the numbers of tourists being taken of whale watching tours has increased almost five times (Figure 22). This has resulted in an equivalent upsurge in the money brought into the sector by these tourists both direct, in terms of payment for the tour, and indirect being the money spent in related services (Figure 23). The result in 2007 was that the total sector in both France and Italy was worth USD 1,460,000 in direct revenues and around USD 4,000,000 overall (Van Klaveren 2007). At this time the individual tourist charges per trip amounted to those given in Table 33.

The presence of the Sanctuary provides strong evidence that its creation raised the profile of whale conservation which manifested itself in an increase in economic activity and returns in this area of the tourism sector.

**Table 33 Prices for whale related tourism amongst operators in the Sanctuary 2006**

| | Whale watching Excursions/cruises | Swimming with |
|---|---|---|
| France | EUR 105.5 | EUR 260 |
| Italy | EUR 90 | None |
| Average | EUR 97.75 | EUR 260 |

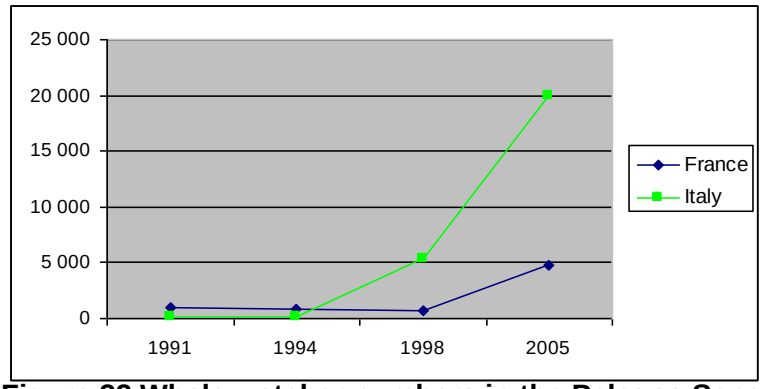



**Figure 22 Whale watcher numbers in the Pelagos Sanctuary**

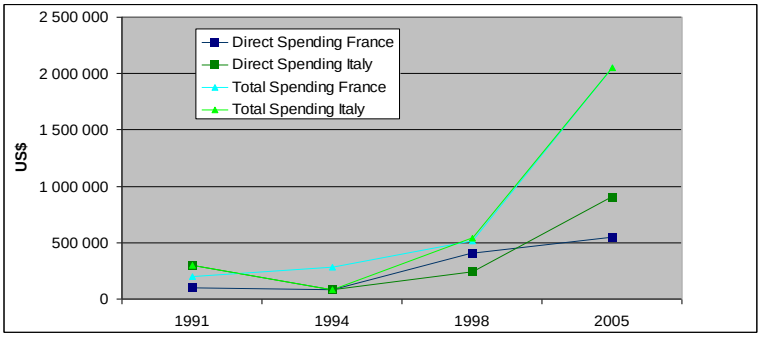



**Figure 23 Direct and total spend by whale watches with operators in the Pelagos Sanctuary (Van Klaveren et al 2007)**

The same effect has been seen at Port-Cros National Park in the coastal waters of the Cote d' Azure but, to capitalise on this, the government of France has levied a 3% tax on all tour operators selling tickets to take tourists around the park, which is passed on for the operation of the park. In Croatia, where some 1.9% of the territorial sea is protected, it is estimated that of the 10million tourists visit the country each year, which provides a very significant component of the GDP, 2 million visit the National Parks including 1 million to the marine parks where tickets are sold.

In some cases monetary income may be deferred to increase management or social capital. For example, at Port-Cros divers have been brought into consultation to produce a Code of Conduct which the divers will follow and monitor through their associations whilst, at the same time, they are not charged for their activities in the park unlike the general tourists.

The acquisition of international recognition such as becoming a SPAMI, Biosphere Reserve or a Natura 2000 site is generally regarded as raising the profile of a park which may be reflected in its popularity and also income. There is another way in which a raised profile

may be a benefit. It encourages research because research proposals are often more successful if based in a reserve. Apart from anything else, the reserve is only there because it is a particularly good example of an ecosystem or habitat and therefore deserves study. Since such research is often part of the remit of the reserve this is an indirect benefit for which the reserve does not have to pay.

In the context of the present study the above costs and benefits need to be seen against the background of possible expansion into high seas areas, particularly in relation to the coastal MPAs and also the possibility of transboundary parks (e.g. Coutansais 2009).

### 9.2.6 Indicators of benefits from tourism

Taking the data from tourist survey around the Pelagos Sanctuary it is possible to produce some indicators of economic benefit that conservation of high seas MPAs may be able to bring. Most of the planned transboudary MPAs tend to coincide with concentrations of cetacean activity whilst in the Ionian Sea case this will also include turtles which also support an ecotourist industry.

At the point at which the Pelagos Sanctuary was being constituted, in 1994, tourist revenues from whale watching were very small, about $ 500,000 in total between France and Italy. By 2005 it had risen to some $ 2 million in each of France and Italy giving an overall total spend of $ 4 million. This was most obvious after 1998 when the project was revitalised and fully constituted. Thus the incremental benefit from tourism from the Pelagos Sanctuary effect was $ 3.5 million or EUR 2.7 million at exchange rates at the time.

Since the sanctuary covers an area of 87,500 km2 this means the incremental benefit is equivalent to **EUR 31/km2/year.**

It is also possible to gain some indication of social benefit resulting from the tourists benefit from the experience. Tourist numbers rise from a minimal level in 1994 to some 25,000 in France and Italy by 2005 an increment of some 23,000. In addition to these direct beneficiaries the operators and their families also benefit although economically rather than spiritually. If a further 1,000 is added for this source then the indicator of the social benefits of the Pelagos Sanctuary is equivalent to **0.3 persons/km2/year.**

This indicator will also help in the management planning of the park since it will give some view on the level of tourism to plan for.

## 9.3 Application of the indicators to the scenarios

### 9.3.1 Selection from proposed high seas transboundary MPAs

A number of transboundary high se MPAs have been proposed including the cetacean related sanctuaries of ACCOBAMS and the Peace Parks proposed by CIESM. In many ways, however, they have similarities in the selected areas. Most recently, RAC/SPAR the UNEP Mediterranean Action Plan regional centre, based in Tunis, has since 2008 been implementing a programme termed, MEDOpenSeas with the aims:

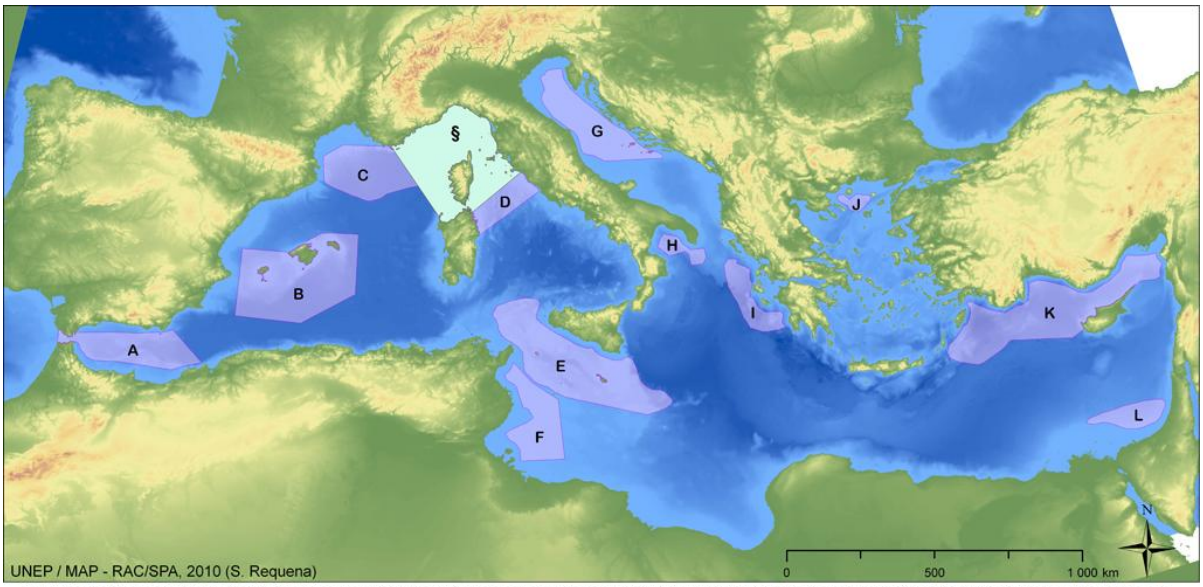
- To promote the establishment of a representative ecological network of protected areas in the Mediterranean, through the SPAMI system, in the open sea areas, including the deep seas.

- contribute to the long-term sustainability of human activities in the region, ensuring the conservation of the biodiversity of these areas and guarantee the sustainable use of their marine resources

The programme is supported by the EU. In planning these open seas MPAs the fundamental criteria for a SPAMI, as stated in Art. 8, paragraph 2 of the Protocol have been used such that the areas must conform to at least one of the following:

- the area must be of importance for conserving the components of biological diversity in the Mediterranean;
- the area must contain ecosystems specific to the Mediterranean area or the habitats of endangered species;
- the area is of special interest at the scientific, aesthetic, cultural or educational levels.

A number of potential sites have been identified and, with this programme ongoing it would make sense to select from amongst those sites (Figure 24).




A: Alborán Seamounts; B: Southern Balearic; C: Gulf of Lions shelf and slope; D: Central Tyrrhenian; E: Northern Strait of Sicily (including Adventure and nearby banks); F: Southern Strait of Sicily; G: Northern and Central Adriatic; H: Santa Maria di Leuca; I: Northeastern Ionian; J: Thracian Sea; K: Northeastern Levantine Sea and Rhodes Gyre; L: Nile Delta Region

§: Pelagos Sanctuary declared as SPAMI in 2001

**Figure 24 Proposed high seas MPAs by RAC/SPA**

In this analysis we have been using three scenarios so the selection has been made based on sites which are in one of those scenarios and which are common to the MEDOpenSEas programme, ACCOBAMS and CIESM. Two sites fit these criteria, those of the North Sicily Strait and the Northeastern Ionian Sea (sites E and I in Figure 24). In this way, the output from this project may add value to the others. These two examples can be used in the appropriate scenarios as bases for the cost benefit model for conservation.

### 9.3.2 Application of the cost benefit model to scenarios.

The specifications of the open sea MPAs have yet to be made since this will be part of the consultation between the partner States when the time come to start implementation. However, based upon the proposed sites by RAC/SPAR, as mentioned in the previous section two have been selected, those of the North Sicily Strait and the North eastern Ionian Sea (sites E and I in Figure 24) as representative of future possibilities. To estimate the representative area of the sites the broad co-ordinates of the outlines were traced on a map and the area estimated by computer-assisted cartography. Such an estimate is in no way intended to influence or prejudge the outcome or specifications of any future open sea MPAs that may be established.

In the case of the Sicily Straits site it is assumed to require the participation of three countries: Malta, Tunisia and Italy. In terms of share if all three countries were to claim their EEZs it is also assumed that 20% of the area would be in Tunisia waters and 40% each in the waters of Italy and Malta. The Ionian Sea site would lie entirely in a Greece EEZ.

Application of the unit prices for costs and benefits derived above to the two selected scenarios provides the view shown in Table 34.

**Table 34 Applying the unit costs and benefits for a conservation area to two proposed sites within the scenarios**

| | Unit value (UV) | Straits of Sicily Area x UV | Ionian Sea Area x UV |
|---|---|---|---|
| MPA Area (km2) | | 151,800 | 21,000 |
| **Costs** | | | |
| Negotiation cost (EUR/country) | 95,300 | 289,900 | 95,300 |
| Operating costs EUR/km2/year | 3.2 | 485,760 | 67,200 |
| **Total costs * (EUR million)** | | **0.514** | **0.076** |
| **Ecosystem benefit** | | | |
| Fishery support EUR/km2/year | 1,050 | 159,390,000 | 22,050,000 |
| CO2 sequestration EUR/km2/year | 136 | 20,644,800 | 2,856,000 |
| **Economic benefit** | 31 | | |
| Tourism increment EUR/km2/year | 31 | 4,705,800 | 651,000 |
| Tourists visits/year | 0.3 | 45540 | 6,300 |
| **Total benefits (EUR million)** | | **184.7** | **25.56** |
| **Incremental benefit (EUR millions) *** | | **184.2** | **25.5** |

* costs include negotiation costs depreciated over 10 years to annualise

The first conclusion to be drawn from Table 34 is that however the benefits with an indicative value of EUR 25.6 million are considered, they far exceed the costs. It is not really justifiable to sum the start-up and annual operational costs but it would be if the start–up costs were to be depreciated over 10 years. Even the operating costs alone are very small compared to the annual income from tourism so financially it seems sound. Even if the government levied a 3% tax on the operators, as they do in the Port Cros National Park - which would amount to EUR 141,174/year for the Sicily Strait example – this would go some way towards directly recovering these costs.

In some ways the two categories of benefit shown in Table 34 are different in nature. Ecosystem benefits are a measure of the ecosystem services provided by the open sea ecosystem and are therefore an intrinsic benefit of conservation of the ecosystem. In the cases analysed above the most relevant proved to be the provision of support to the economic sector of fishing and the role of the sea in sequestering carbon as a contribution to climate regulation. These benefits are not, however, incremental in that they will immediately be gained once an MPA is in place – they exist already. However, the point of conservation, by definition, is that it prevents these benefits being lost and guarantees them into the future. This is the benefit the MPA brings.

The economic benefit of initiating an MPA is that it encourages and stimulates tourism. In looking at the Pelagos Sanctuary example the unit benefits were estimated as an increment of before and after. So this benefit is incremental and represents the direct economic value of constituting an MPA. Hence, it is a direct trade off with the operating costs.

Another way of looking at the tourism value, however, is that this is the value that people are prepared to pay to experience and interact with the ecosystem in general and the biodiversity in particular. It is a direct use value and indicates how much people value the ecosystem and its biodiversity and its services. In this way, like the other Ecosystem Benefit values they represent an intrinsic valuation of the ecosystem and its services and, on this basis, the value could all be added together to represent the value of services that conservation assures and the full conservation value of the MPA.

There is a further aspect to the use of tourism to provide a direct use value of ecosystem services. As discussed above, whilst tourism indicates the direct value people put on the use of ecosystem services the contributions from external and international agencies indicates indirectly how much third parties might give to know that such conservation is taking place, this is known as the Existence Value.

Thus the EU is giving support directly to the MEDOpenSeas programme which is planning such MPAs. The WWF and IUCN and IFAW, amongst others, all have conservation programmes in the Mediterranean. This is using public money from either people's taxes or by direct donations to NGOs with the tacit understanding that people support and value that programme and the conservation it brings about to the ecosystem and its services. There could therefore be a further line of value put on the ecosystem services which would be a monetarised indicator of how much external agencies are contributing to the MPA as a measure of this indirect existence value.

However, even without this and even if the transaction costs on setting up the MPA are underestimated, it still seems that the conservation benefits of setting up a new open seas MPA in the Mediterranean considerably exceed the costs by several multiples.

### 9.3.3 Constituents and sensitivity of the analysis

The model resulting in Table 34 is set up to a very defined set of parameters and indicators. There may however be variants within this framework which in some ways might be thought of as a sensitivity analysis.

The transaction costs of negotiating the setting up of the conservation area is built up from a very flexible commodity, the time of public servants and others and that it follows the procedure to set the MPA up as a SPAMI. The Pelagos Sanctuary was initially set up as a three country agreement outside the SPAMI system which may well have been simpler even though it still followed a similar step by step approach (Van Klaveren et al 2007). There is

also the possibility that negotiations may become drawn out and the costs increased. Even if this were to be the case the cost of setting up the MPA would have to be increased many times before it even approached the benefits. The justification remains very high even under difficult circumstances even with more protracted negotiations or more stakeholders being involved.

The **beneficiaries** definitely include the fishing industry but downstream, all those involved in the food chain including the customers, many of whom may be tourists indulging in their favourite fish thereby enhancing the amenity value of the region. Tourists and tourism are directly benefitting from the opportunities to visit the reserve and its biodiversity whilst the people within the tourists industry are benefitting from the sale of services. Beyond this, the general coastal population may benefit from increased value of real estate. The CO2 sequestration property benefits the whole Mediterranean population and beyond by removing excess $CO_2$ from the atmosphere which mitigates the contribution to climate change.

Fisheries benefits and open sea are very high. An analysis of all the catches from All the species in the Mediterranean by Plan Bleu (2010) showed that 74% of all annual catches by weight were of pelagic species coming from water greater than 100m depth. The value given to the fish was not biased by species market value or by value added. To this extant it gives equal value to the diversity of species. Indeed, of the 189 species of fish and crustacean appearing in the fishery records, 63 or 33% were found in the open sea community. Never the less, it is the high proportion of the catch coming the open water ecosystem which means that the fisheries support service provided by the open water system is proportionately, very valuable.

The carbon sequestration component is quite significant in terms of the value of services provided. The rate of sequestration is regarded as being relatively constant but it can be given a value because carbon is now traded. The fact that it is traded, however, also means that the price may vary. In the present case the current going rate is EUR 11.5 per tonne but for periods from 2004 to 2008 it was around EUR 20 per tonnes with suggestions that this might be tripled under certain circumstances. With this in mind, the value given in Table 354 could well be at least doubled and provides a variable in the value system which is currently at a low point. Plan Bleu has estimated the sequestration value of the whole High Seas area of the Mediterranean as equivalent to EUR 2.2 billion per year.

The value of creating an open sea MPA has been made based on its intrinsic services. The costs of its operation are based upon a system, such as the Pelagos Sanctuary, where control and surveillance are not major issue. Originally, a driving force for the reserve was the incidence of tuna drift net fishing and its cetacean bycatch. However, this was banned very early on and subject to an alternative income generating scheme so effectively ceased. Even so, PELAGOS does come within much of the coverage of the CROSS Med operation, which although run by France, does include elements of the Italian section, although not all of it. From this view point it could be said that the Pelagos Sanctuary benefits from the control operations of CROSSMed but these are not included in the operational cost for the reserve given in Section 9.2.3. Operations could include control costs since the Pelagos Sanctuary has CROSSMed but then would get benefits of cleaner seas even higher services? If no fishing in MPA may need fishing control if not there already. However, if we include the costs of CROSSMed we should also include the benefits as outlined in Section 7.4. Thus for the Straits of Sicily the value put on the services of clean sea being protected or conserved by CROSS Med type surveillance is EUR 273.2 million for the Straits of Sicily and EUR62.9million in the Adriatic (Section 7.2) which would make it the largest single source on benefit for conservation. Of course the operational cost goes up as well. The value here is more or less an insurance premium to protect the ecosystem services from a specific threat, that from chemical damage from oil pollution. Part of that damage can be loss

of production to the fisheries in the system. The threat is greatest in the Straits of Sicily by virtue of the enormous traffic levels (Section 9.3.3).

There is another possibility for control which uses community participation and stakeholder involvement. The great majority of protected areas have a coastal interface. An exception to this, however, is the Etablissements de peche of the Alps Maritime. There are three of these and they are not very large (see above list) but unusually they are entirely maritime with no coastal strip or islands. They suggest a useful model for entirely marine parks with their associated costs and benefits. These refuges were set up with full consultation with the fishing communities who, themselves, realised that such refuges could contribute to the sustainability of their livelihoods. Thus, whilst these areas are subject to control and surveillance by the local police, navy and aeroplanes, an important role is also played by the fishing community themselves in terms of reporting transgressions since they are against the community. They represent, therefore, an interesting example of community management with part of the cost effectively being covered by the beneficiaries.

The economic survey work done around the Pelagos Sanctuary enabled us to put an economic value on its use. This was almost entirely due to increased whale watching tours. To look at other possibilities there is a good example of the National Marine Park of Zakynthos in the Ionian Sea off the west coast of Greece which is very close, or even inside, the proposed MPA considered above for the Adriatic scenario. This park includes Laganas Bay and some of the coastal waters of the island of Zakynthos which is renowned as one of the few nesting grounds of the endangered Loggerhead turtle (*Caretta carreta*). The conservation of the Loggerhead was one of the reasons the reserve was given national Park status but it also must co-exist with Laganas Town one of the most popular package holiday reports on this coast. Fortunately, in some ways, the Loggerhead is a large, spectacular flagship species which has become a favourite tourist attraction which involves sea excursions to watch them at sea, even though their nesting beaches need 24 hour protection. So popular has turtle watching become that it appears on most tourism brochures and the turtle has become the mascot of the town. Consequently, there is already a market for ecotourism and whale watching may also be offered. The creation of a sanctuary for cetaceans by an expansion of the protected area would give a boost to this as well as to turtle watching.

To examine the economics of this the annual reports show that the National Marine Park of Zakynthos in 2010 raised revenue of EUR 2,530,812 whilst its operational costs in terms of staff and services amounted to EUR 1,449,341. With an area of 134.6 km2 the unit costs are revenue 18,802/km2 and costs are 10,768 km2 giving an incremental benefit of EUR 8,034/km2.

There is a similar example from the second National Marine Park in Greece at Alonissos. Here the most recent revenue is EUR 611,626 whilst the annual operational costs were EUR 462,650. Consequently, their relative values in this park of 2.27km2 are EUR 267,439/km2 and EUR 203,810/km2 leaving an incremental benefit of EUR 63,629/km2.

Comparing this to the incremental benefit between operational cost and tourist benefit from the Pelagos Sanctuary of EUR 31/km2 (Section 9.2.4) there is clearly room for this level of return to be higher in certain circumstances. Clearly, the park at Zakinthos is smaller and coastal, although the voyages are not necessarily confined to the park itself. There are also plenty of merchandising opportunities form the large number of tourists virtually living in the park. However, this could no doubt act as a spring board for the further development of marine adventure voyages once the maritime MPA and sanctuary is declared. There would thus seem scope for considerable increase in this term in our costs benefit equation. It might further indicate that open sea MPAs might work better if they include a stretch of coastline and in, more direct association with potential beneficiaries and stakeholders.

There are also considerable differences in relative operational costs between the Pelagos Sanctuary and the two examples from Greece. This raises the general question that if a conservation area is set up how much control is required. In the Zakynthos case there is a considerable, round the clock need for control, particularly during the breeding season. In an open sea MPA, as in the Pelagos Sanctuary, this is not necessarily the case. Generally, however, in the new MPA there will probably be no intention of limiting access to the MPA on the open sea since this would probably not be practical. But protection of the environment and habitat from oil pollution to preserves the ecosystem processes and biodiversity would probably be valuable. In which case, some CROSS Med type approach would be required. Cheaper versions could be used by closer monitoring of VMS and other location detector systems as in the fish parks of Alpes Maritime. By the same token, the costs of a system such as CROSSMed also bring the added incremental benefits from pollution protection to offset the costs as examined in Section 7.4. In addition, including stakeholders in the agreement process can also give additional eyes and ears.

There may also be the question of banning or more strictly regulating fishing or other extractive processes which would also require the heavier control and surveillance system. Never the less, the increased costs are still considerably exceeded by the benefits.

Variation in transaction or negotiation costs is most probably a function of the number of parties to the agreement. Each country has to go through more or less the same process so the cost is less likely to depend upon the area of the MPA in question but how many borders are involved. This is shown in Table 35 above where the cost for setting up the MPA in the Ionian Sea involves only Greece whilst that in the Sicily Straits involves three countries with this difference being reflected in the transaction cost.

## 9.4 Open Sea MPAs and EEZs

With the benefits from setting up a new open sea MPA firmly established and consistently exceeding the costs even considering the variance of the constituents the remaining important question is whether the presence of EEZs would be of further advantage? One immediate benefit would be in the area of control. As outlined above, if vessel pollution is to be controlled then a surveillance service is required with legal teeth as exemplified in the case of France with it EPZ (Section 7.2). Only when the State could enforce the system by raising fines from EUR 3,000 to EUR 312,000 through direct prosecution of vessels in their legal EPZ, was the control effective. This has been the case over part of the Pelagos since part falls within the French EPZ and within the range of CROSSMed. Most recently, however, the creation of the new EPZ of Italy in the Tyrrhenian Sea now invests the whole sanctuary.

This increased effectiveness of control could also generally be the case in an open sea conservation area. Control would be much more effective in enforcing the rules of management plans, environmental protect or fisheries if the MPA was within EEZs. Without this States have virtually no power to supervise or enforce conditions which may be part of the agreement between them, upon the activities of third parties. This is shown most dramatically by a recent case which should be highlighted:

- *Four years ago a well known cetacean scientist from the USA, Peter Tyack, approached the Pelagos Committee with a permit from NOAA, who apparently have a license to authorise such things, which allowed him to investigate the impact of military explosive devices underwater on the behaviour of cetaceans. The permit actually specified the Pelagos Sanctuary as the site of this experiment. The Committee were unable to do anything about this since the trials were to be in the*

*High Seas area of the sanctuary. They did manage to get some concessions on the conditions and severity of the trials but were powerless to prevent them. Ultimately a German vessel flying the NATO flag came and carried out the exercise. Subsequently a similar exercise was carried out two years ago by the same scientist in the area of the Alboran Sea proposed by ACCOBAMS as a future sanctuary*[262]

This case exemplifies *par excellence* problems which can arise when countries do not have full control of their waters, or an international MPA, if it lies outside the EEZ or EPZ. Such studies are very controversial even with the research community[263]. This can be distinguished from military exercises, which may be permitted (see Section 2.6.9), by being authorised by a civilian institution and subject to a specific research grant.

The possession of EEZs might also enable participating States to negotiate more effectively. For example, if there were a question of needing to change navigation routes to minimise contacts with whales or bluefin tuna then only States can really negotiate with the IMO. In addition, there might be more of an incentive to conservation if the water is 'yours'. Sovereignty may well ignite responsibility although this is not quantifiable. In this way, negotiations to set up an MPA may be more 'joined up' and more efficient, thereby cutting costs.

A special case is that of the EU Member States. The EU has an overarching policy which includes the Habitats Directive within which there is a responsibility of States to set up MPAs in their territorial waters including EEZs. Setting up an open sea MPA would therefore be totally coherent with the terms of this directive and also there is a facility tom assist with funding. However, only with the legal status of an EEZ, thus marking 'EU waters', does the rolling out of policy into the open sea become a responsibility of a Member State. Thus, under the EU, there is a positive policy reinforcing the conservation options for the open seas rendering the EEZ a definite plus in the case of Member States.

[262] http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA533450
[263] http://www.whales.org.au/news/tyack.html

# 10 Maritime surveillance

The starting point for a consideration of surveillance is that apart from the routine surveillance of navigation many if not most activities that are subject to surveillance including gun running, drug and people smuggling and security are not economic activities and, as other studies have shown, are not susceptible to cost benefit analysis (eg PRC 2010). It is also worth recalling in this respect that an EEZ, as its name suggests, confers specific rights upon coastal States in respect of economic activities and not to security or criminal issues.

It might be possible to analyse the situation concerning pluses and minuses for surveillance using an example of surveillance which is within the sphere of economic activity. We have already looked at one example control and surveillance with respect vessel based pollution control in Section 7 from which certain conclusions were drawn. It may be useful to look at another economic example in the fisheries sector for comparison.

The situation is often very complex and involves a complete mixture of vessel and competences from both military and civilian sources. For example, in the waters of France fisheries protection is conducted by CROSSMed whose activities in connected with pollution control were analysed in Section 7. CROSSMed is also responsible, not just for fisheries and control of vessel pollution (SURPOL) but also for search and rescue and surveillance of navigation (SURNAV). It becomes very difficult to isolate the costs of, for example fisheries, from amongst this range of responsibilities. It is even more difficult in this example because contributing to at-sea inspections are vessels of the government department of Affaires Maritime, Gendarmerie Maritime, Gendarmerie National and Douane (CROSSMed 2010). Again these vessels have a range of responsibilities and therefore shared costs. Fisheries control commonly involves naval or coastguard vessels with budgets outside the economic sector hence the difficulty of applying a monetarised cost benefit approach.

However, an appropriate case is provided by the Joint Deployment Programmes (JDPs) for the control and surveillance of major fisheries around Europe which are prepared and implemented by the Community Fisheries Control Agency (CFCA) [264] The CFCA has very recently been renamed the EFCA (1/1/2012) with a new regulation with more flexible rules but since the base year for the fisheries models in the work is 2008 for the purposes of the present example those of the earlier regulation will be used..Implementation of the CFP remains, of course, a Member State competence. Essentially, the concept of the JDP seeks to improve the effectiveness and efficiency of control measures by pooling means of inspection, including vessels and inspectors, and to enhance coordination of surveillance effort.

The issue of joint patrols raised several practical questions in terms of international law. As described above, under UNCLOS a coastal State has the exclusive right to undertake control and inspection procedures against fishing vessels in its own EEZ. In other words neither a fisheries patrol vessel nor and aircraft from State A may undertake fisheries control or inspection activities in the EEZ of State B unless it is by express permission. Equally, a law enforcement officer, such as a fisheries inspector, may enter another country by normal legal means but only in a capacity of a private citizen as far as the host is concerned. The EU dealt with these issues by firstly via the framework of Commission Regulation (EC) No 1042/2006 (now superseded by EC No 404/2011) whereby rules for access to EEZs by vessels have been established and by conduction of inspections by teams of two or more inspectors, one of which is a National Fisheries Inspector of the coastal state within which the inspection is being conducted. Even so, cumbersome national access procedures and

[264] Council Regulation (EC) No 768/2005 establishing a Community Fisheries Control Agency applicable to the CFP. OJ 128, 21.5, p1, as last amended by Regulation (EC) No 1224/2009.

sovereignty rules still mean that access to some EEZs may be lengthy or denied for JDPs on the western seaboard of the EU (ie in the Atlantic and North Seas) where EEZs have been established (CFCA 2009)[265].

In 2008, the Commission became most concerned at the state of the Bluefin tuna fishery in the Mediterranean. Quotas were being overrun regularly, under reporting was thought to be rife and the RMFO tasked with managing the stock, ICCAT, judged that the stock was overfished. To tighten control the CFCA initiated a JDP amongst the Member States involved in the fishing namely, Spain, France, Malta, Italy, Croatia, Greece and Cyprus. In the case of the Mediterranean, however, the pooled means could roam freely over the high seas areas through which much of the migratory Bluefin tuna stock passed. In 2009, some 11 vessels were made available by Member States which had access except to Territorial Seas and any fishery protection zones. There are of course other participants in the fishery including Morocco, Tunisia, Libya and Turkey, most of which field their own fishery protection vessels. In 2008, which is also our base year for fisheries models, the Mediterranean JDP was just finding its feet so we have taken the first and closest really representative year for data as 2009 (CFCA 2009).

Clearly, the high seas aspect in the use of shared means, which can carry mixed teams of inspectors, should render inspection much more efficient than in cases where there are EEZs which might restrict access to a greater or lesser degree as seen on the Atlantic coast. In addition, the JDP teams cannot just inspect EU vessels on the high seas. When ICCAT allocates a quota it does so on the understanding that an ICCAT inspector has the right to inspect the recipient's vessels upon request. Thus, if at least one of the inspectors on the JDP team is also an ICCAT inspector, which tends to be the case, then on the high seas non-EU vessels can also be inspected. This, in fact, does happen although not very frequently since EU fleet operations and those of other ICCAT members do not overlap very much (CFCA 2009).

An approximate indicator of relative efficiency of inspections can be obtained by relating the number of vessel inspections to the number of patrol days at sea for inspections in the Mediterranean on the Bluefin tuna (BFT) JDP and those for JDP operations on the western seaboard (Table 35). The number of days at sea is the major cost of the operation with CFCA suggesting and average cost of EUR 15,000 per sea day. This is a little more than the cost used for research vessels in Section 10 but fisheries patrol vessels tend to be rather more expensive then research vessels.

**Table 35 Relative efficiency of inspections and indicators of compliance in Joint Deployment Programmes (JDP) in fisheries**

| JDP | Days at Sea* | Inspections* | Infringements Detected* | Inspection Efficiency (inspections /sea day) | Compliance (Infringements/ inspection) | Compliance Index+ |
|---|---|---|---|---|---|---|
| BFT | 267 | 451 | 72 | 1.67 | 0.16 | 6 |
| Baltic | 169 | 413 | 26 | 2.44 | 0.06 | 17 |
| Western waters | 60 | 122 | 8 | 2.0 | 0.07 | 14 |
| NEAFC | 131 | 58 | 3 | 0.44 | 0.05 | 20 |

** Source of data: CFCA (2009)*

*+ Compliance Index is the reciprocal of no. infringements per inspection*

This shows that whilst the Bluefin JDP accomplishes by far the highest number of inspections the efficiency of inspection rate in relation to days at sea was moderate. It might have been anticipated that since patrol vessels can travel throughout the high seas of the Mediterranean without the same constraints of sovereignty of their colleagues in the western

[265] CFCA (2009). Annual Report of the CFCA for 2009.

seas, that their efficiency might be higher. Indeed the Annual Report of the CFCA for 2009 makes the very comment: 'Obviously, having flexibility in high sea fisheries patrol vessels could be very useful. The CFCA then go on to give an example of how a French patrol vessel was moved at short notice from the Central Mediterranean, where fishing activity was found to be low, to the Eastern Mediterranean where it was much higher. Never the less the CFCA (2009) concludes, '….however, flexibility in high seas fisheries control vessels is definitely much more problematic due to its logistics'. Which emphasises the complex nature of control and surveillance, within which flexibility is only one factor and maybe, this example might suggest, not the most important?

Despite this flexibility in the use of Member State vessels the CFCA still considers the charter of a dedicated vessel by the EU which could inspect under the auspices of ICCAT alone. Firstly, such a vessel would be of a suitable size commensurate with the particular needs for Bluefin inspection and secondly it would be able to pursue inspections in areas, such as fishery protection zones of non-EU countries such as Tunisia and Libya, where Member State inspection vessels cannot operate due to sovereignty issues. There are limits to flexibility.

There are two elements to a control system – detection and compliance. Compliance is broadly the extent to which the participants play by the rules. Compliance is normally reinforced by appropriate penalties imposed upon those who are detected in breaking the rules. Where EEZs are in place, a fishing vessel showing a serious infringement at inspection can be arrested by the coastal State inspector, escorted to port, prosecuted and fined or otherwise penalized. In other words enforcement is in the hands of the coastal State. On the high seas, as in the Mediterranean, an infringement can only be noted and a report sent to the flag State and ICCAT. It is up to the flag State to determine whether or not there has been an offence through an appropriate judicial or administrative procedure, and if an offence is established to impose a penalty. The enforcement system is therefore much less direct and has many similarities between the control of vessel pollution before and after the imposition of the EPZ (Section 7).

As well as the number of inspections carried out under JDPs it is also possible to determine the number of infringements detected (Table 35). Whilst the bluefin JDP has the highest inspection rate, as remarked above, it also has by far the highest rate of infringements, found in some 16% of all inspections made. By comparison, the infringement rate on the other JDPs is much lower at 6-7%. This implies these other fisheries are much more compliant and a simple compliance index has been made by merely taking the reciprocal of the infringement rate in order to give a more intuitive ranking with the least compliant fishery having the lowest score (Table 35). The CFCA Annual Report of 2009 actually disaggregates infringement rates for EU vessels inspected at 8% of inspections compared to rates for non-EU ICCAT operating vessels at 59%. Interestingly, the EU rate of 8% is very similar to those of the EU JDP shown in Table 35 which are 6-7% and may represent the knowledge amongst EU vessels that there is a good chance that their own flag State will act. This may also be the case for the NAFO/NEAFC fisheries although, certainly in NAFO, Canadian inspectors are also active and have assumed fairly tough approaches to inspection and control albeit on the high seas.

From this simple analysis it would appear that detection could be facilitated by the lack of EEZs but that ultimate enforcement and compliance suffers through weak or indirect governance. In terms of managing the fishery this leads to a serious lack of control and compliance rates half that of regions with EEZs. As a further indicator of this the number of operators where one or more infringements were detected only fell from 14% in 2008, the first time the JDP operated, to 12.5% in 2009 a sign that no great deterrent was being imposed. The low compliance must be considered a dis-benefit since the increased yields resulting from sustainable management have been forgone.

The recent totals fishery for Bluefin tuna according to ICCAT were as follows:

| Year | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|
| Quota | 29500 | 29500 | 28500 | 22000 | 13500 |
| Atlantic East | 7535 | 8037 | 7645 | 6684 | 4379 |
| Mediterranean Catch (t) | 23154 | 26479 | 16205 | 13016 | 6949 |
| Total Catch (t) | **32501** | **36154** | **25849** | **21680** | **13158** |
| Percentage of quota | 110% | 123% | 91% | 99% | 97% |

Thus the catch in the Mediterranean in 2009 was some 13,000 tons. At EUR 5,000 per ton (average price taken from international market prices, eg. Infofish, used for fisheries model in Section6.1) during 2009 this would mean that in the Mediterranean, at first sale price provided above, this would give it a value of EUR 65 million.

To put some cost on the control we can take the number of sea days of 267 by patrol vessels under the JDP (Table 37) and multiply by EUR15,000 per day, which is the average cost per day of a patrol vessel used by CFCA, giving a cost of around EUR4million per year. This cost is only 6% of the EUR 65 million first sale value of the 2009 catch. There are of course, other costs but the at-sea inspection is the most expensive. However, as indicated in Section 6.3.4 efficient control is a potent element in sustainable management which will help with stock recovery of this very valuable species and a realization of the potential resource rent of the stock with consequent economic and ecosystem benefits.

The general picture for both vessel pollution (Section 7) and fisheries examples (this section and Section 6.3.5) suggests that EEZs may facilitate detection (although the larger area of jurisdiction mean increased cost) but enforcement and compliance are generally given teeth by the powers conferred by EEZs in the regulation of economic activity by transferring the right to sanction from the flag State to the port State.

Given this distinction between detection and enforcement and compliance demonstrated by surveillance in economic sectors and the powers gained from an EEZ, is this replicated in security related non-economic activities given the point made above that the EEZ rights are, by definition, restricted to economic activities?

This is best examined through a number of scenarios. Take the case of a coastal State naval frigate patrolling its EEZ. As described in section 2.6.3 above, the existence or otherwise of an EEZ has no impact on the rights of the coastal State, and thus its frigate, to undertake inspection and control actions with regard to activities that do not fall within the EEZ regime. Thus, in the current example, while frigate may routinely stop and inspect vessels engaged in fishing activities there but it may not routinely inspect third country merchant vessels making innocent passage through that EEZ absent agreement with the flag States involved. The same rule applies obviously on the high seas.

If the coastal State has information that a vessel is involved in illegal trafficking activities it may on the basis of the agreements mentioned in Section 2.6.3 be entitled to stop and arrest such a vessel or even, depending on the circumstances to make an arrest or to participate in an arrest, but only with the express consent of the flag State. Again the situation is no different in the EEZ to the situation in the high seas. The existence or otherwise of an EEZ makes no difference.

# 11 Offshore renewable energy

The development of offshore renewable in the Mediterranean is still in its very early stages.

As noted in Section 5.2.3 above, it does not appear that the use of tidal power will be feasible in the Mediterranean due to the exceptionally small tidal range of less than 2m on average.

Across the whole of Europe the use of wave power has scarcely moved beyond the level of demonstration plants of which there are none in the Mediterranean therefore it is most unlikely that the use of wave power is going to be a significant feature in the foreseeable future (Wagner 2010)[266].

Thus the only immediate consideration remains the use of wind power. Currently, most wind power units are built on the sea bed and even those currently being tested that float are tethered to the bed.

The Legal Analysis suggests that, for this very reason, an EEZ for the overlying water makes little difference to the rights of the coastal State since these are already met by its automatic claim to the sea bed under the EEZ from which it already derives its rights under UNCLOS. From Article 60 the coastal State has the exclusive right for the construction of artificial islands as well as for the authorisation and regulation of their construction, operation and use. In this case an artificial island includes structure built or tethered to the sea bed. Accordingly the coastal State can also prohibit the construction of artificial islands for reasons of the protection and preservation of rare or fragile ecosystems. There is one conditional element outlined in Article 60(7):

> Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.

In other words there must be some dialogue with certain other users particularly via the IMO for navigational issues. OSPAR has in fact, established guidance on assessments of the environmental impacts of, and Best Environmental Practice for, offshore wind farms in relation to location but makes no differentiation between territorial saes and EEZs[267].

The fact remains that the Mediterranean is not an ideal location for the exploitation of wind power particularly because the power units are linked to the sea bed. The sea has very few extensive shallow areas on which construction can readily take place even within the Territorial Seas. Outside the Territorial Seas much of the open water, which might make up the EEZs, is very deep. However, one such plan has emerged of southern Italy from the 4Winds project to build wind farms on shallow banks on the underwater limestone ridge between Sicily and Italy that separates east and western basins[268].

In this case the wind farms are to be built in waters beyond the existing jurisdiction of Italy although on what is the continental shelf of Italy under UNCLOS (Figure 25). However, under Article 60 of UNCLOS the coastal State has the use of the seabed within an EEZ

[266] Wagner, A. (2010). SEANERGY 2020 project, Deliverable D2.3: Report including the main outputs and conclusions of Work Package 2, National MSP Regimes. EC Intelligent Energy

[267] http://www.ospar.org/documents/dbase/decrecs/agreements/05-02e_Guidance%20Location%20OWFs.doc

[268] http://www.4wind.it/

without the claim being made so Italy can authorise this project. It is not immediately clear what rules for planning permission will apply since a recent survey suggested they were not yet available for wind power projects beyond the territorial sea (Wagner 2010). Presumably those in use within the territorial sea would be used but this new situation does require some thought. There appear to be five authorities involved in the various permits required which might relate to the right to use the sea bed or laying cables or connection to the grid.

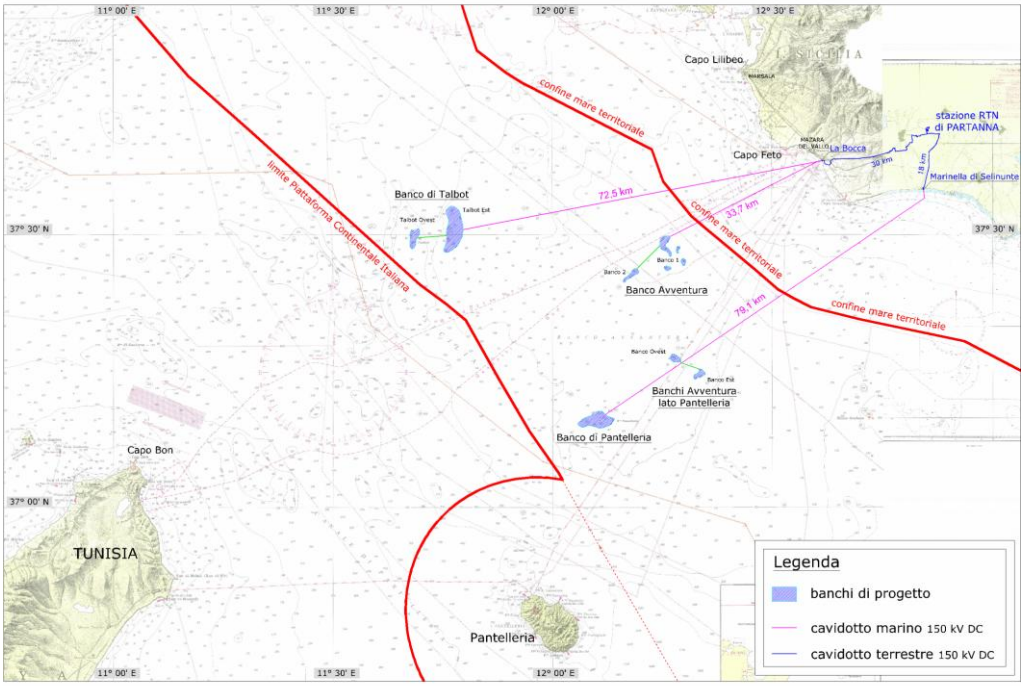



**Figure 25 Proposals for 4Winds project showing 12nm Territorial Sea and limit of the continental shelf of Italy (leftmost red line)**

In this example, which has similarities with the situation in Germany where wind farms can only be sited in the EEZ and not the territorial sea, at least in the Waddenzee area, the cable links are extremely long. However, this has purely economic implications and not the right to be able to lay those cables. When, the cables pass through the Territorial Seas they can conflict with well established fishing interests but and apparently it is this which has provoked some concerns from the communities in Sicily.

Italy, therefore, has no concerns about building a windfarm outside it territorial sea and is completely within its rights relying on its continental shelf. There are responsibilities that go with this in that the State must assure itself it is not endangering fragile habitats on the site and, as quoted above, must ensure that no hazard to navigation results, hence there may need to be discussions with the IMO. This, however, is the case with any offshore windfarm. Consequently, to a country such as Italy, its policy for the exploitation of offshore renewable energy is in no way dependant on the declaration of an EEZ. For as long as the techniques are rooted in the sea bed then the existing rights from the continental shelf are sufficient. The only modifying aspect to this if the windfarm is close to the boundary of the national continental shelf when a proper negotiation and agreement on those boundaries is advisable.

Italy is not alone in this position in considering building windfarms beyond the territorial seas.

The UK has never claimed an EEZ, only an FPZ. For its offshore windfarms, many of which are built on shallow sand banks far out in the North Sea, it has relied on its continental shelf for those beyond the territorial sea. Never the less, at the moment the UK has the greatest installed capacity of offshore wind energy in Europe at 1,340 MW (Payne et al 2010)[269], a proportion of it on the continental shelf and this has clearly not been a barrier to development.

There is, therefore, no need for an EEZ proper to allow for windpower to be developed beyond the territorial seas. A subsidiary question, however, is that maybe it might make the process more efficient and therefore provide benefits from cost savings. Many countries use more or less then same regulation and permitting process in the territorial seas as in the EEZ (Payne et al, 2010) in other words it doesn't seem to automatically require a different process. There are some countries with significant differences. In Germany, for example, the territorial seas are under the jurisdiction of the Landers whilst the EEZ is a federal responsibility. This, never the less, reflects the constitution of the State rather than being a function of the maritime zones. Italy does have procedures for permitting windpower in territorial seas which are similar to those used on land. The WINDBARRIERS project is reviewing the efficiency of planning wind power across Europe using the average time taken to complete planning permission as a measure of efficiency[270]. In the most recent survey Italy ranks 4th with an average building consent time of 18 months against an average of 42.3 months for onshore and 18.5 months for offshore projects in Europe. The UK, with its extensive experience of construction beyond the territorial sea without an EEZ is ranked 8th out of 22 countries with an average consent time of 28 months so its efficiency does not seem to have been undermined by operating without an EEZ.

There is the additional question of whether servicing and monitoring of the installation might be affected by an EEZ. Again, the experience of the UK suggests this is not the case. Surface vessels attending the unit should have a right of legitimate business on the high seas and cable laying relates to the sea bed and all countries have a right to do this. The only complication is if different institutions are invested with the rights of planning and regulating the territorial seas compared to the EEZ but this is not insuperable as shown by the case of Germany mentioned above.

The one remaining area where wind power projects might be disadvantaged by a lack of an EEZ is in relation to Marine Spatial Planning (MSP). The general rationale of the MSP component of the IMP is that this renders multi-sectoral use of the marine space more efficient and cost effective by reducing conflict and the increased transaction costs and opportunity costs that go with this. Without an EEZ the regulatory framework for MSP is largely missing rendering conflict with other sectors more likely and making the integrated use of all marine resources rather more difficult. The infrastructure element of windpower does mean that it has very tangible spatial requirements that may need it to be planned in relation to other sectors such as fisheries or aquaculture but the extent to which windpower specifically is disadvantaged is a debatable point. Since one of the greatest potential point of conflict with windfarm sites is with routes for navigation, which is actually dealt with through the IMO, the notional advantages of an EEZ to facilitate negotiation is not therefore really an issue. Even so, it could be worthwhile to develop the rules for MSP within the territorial sea and then extend them beyond by mutual agreement with neighbours although this would still have a transaction cost attached to it.

[269] Payne, A.I., Hodgson, S., Tindall, C. and Harris, C. (2010). SEANERGY 2020. Comparison of Best Practice across the EU in Maritime Spatial Planning. EC, Intelligent Energy.

[270] http://www.ewea.org/index.php?id=60&no_cache=1&tx_ttnews%5Btt_news%5D=1834&tx_ttnews%5

In conclusion, it is difficult to attribute any significant change in costs or benefits from on EEZ in relation to offshore renewable.

# 12 Overarching factors

## 12.1 Sovereignty

While a full discussion of the notions of sovereignty and sovereign rights is beyond the scope of this report it is clear that sovereignty can be the single most important reason why a State may decide to claim an EEZ. The notion of sovereignty, and the related exercise of rights that derive from sovereignty is not quantifiable since it is an aspect of political will and is the right of the State concerned. A State may claim an EEZ or derivative zone simply because it can - not because of the advantages and disadvantages of costs and benefits.

We have seen examples where the best intentions of States to reach agreements in the high seas can be breached by third parties when those rights are not in place. The intrusive sonic warfare research licensed by NOAA and carried out reportedly by a NATO vessel in the middle of the PELAGOS Sanctuary in direct contravention of the agreed intent of the three coastal States was possible because the States in question had chosen not to exercise their sovereign rights over that particular maritime area (Sections 8.7,, 9.4.).

Disagreements on the area of those rights have lead to misunderstandings and even disputes.

There has also been the case of the possible appropriation of genetic material from the seabed which a State may not be able to control, or even worse, secure the IPR of genetically engineered products by third parties (Section 8.7.3) without full control of its waters.

Thus perception of sovereignty is a make or break element which in some ways, relates to the negotiation or transition dealt with in the next section.

## 12.2 Maritime Spatial Planning

As has been made clear (MRAG 2008) coastal states have virtually no rights to set up Maritime Spatial Planning process for the waters of the High Seas, unless subject to complex agreements with neighbours, thus it has not yet been rolled out in the Mediterranean to any great extent. . This has been alluded to in the earlier section on offshore renewable energy.

The intensive use of the Mediterranean culturally, socially and economically suggests that Maritime Spatial Planning (MSP) is an evident need to improve synergy and efficiency between users and to avoid disputes or degradation of resources. The economic aspects of Marine Spatial Planning, which is one of the three overarching pillars of the EU Maritime Policy, have recently been examined in a recent report for DG MARE (2010)[271]. Four areas of potential benefit were identified:

- enhanced coordination and simplified decision processes,
- enhanced legal certainty for all stakeholders in the maritime arena,
- enhanced cross border cooperation and

[271] (DG MARE 2010). Study on the economic effects of Maritime Spatial Planning Final report. Directorate-General for Maritime Affairs and Fisheries MARE.E.1 'Maritime Policy Baltic and North Sea' April 2010. http://ec.europa.eu/maritimeaffairs/study_msp_en.html

- enhanced coherence with other planning system

Whist some non-economic effects were also thought likely to result from MSP, such as support for management in realising a good environmental status in the coasts and seas[272]. Within these areas three main economic effects of Maritime Spatial Planning were further identified (DG MARE 2010):

- *coordination efficiency* for governments is likely to result due to improved and integrated decision making.
- *reduced transaction costs* for maritime activities (economic terminology for search, legal, administrative and opportunity costs) operating in the maritime arena.
- Benefit to society from the enhanced certainty resulting in an improved *investment climate*.

However, the study found these benefits to be mostly not eligible for macro scale economic quantification. Amongst these only a 1% increase in benefits from transaction costs were detectable. In the context of the present study, therefore, the contribution from MSP to the final synthesis would be a further 1% increase on all benefits under the influence of effective MSP.

However, another study specifically on the Mediterranean concluded that with regard to the institutional and legal framework, most countries in the Mediterranean have not yet developed legislation that accommodates MSP (DG MARE 2011)[273]. It also pointed to the fact that most countries have not yet established Exclusive Economic Zones, which would enable them to manage the associated sea space under national jurisdiction, which was perceived as a disadvantage. It was noted particularly that, with regard to MSP, management and control problems currently exist not only in the areas far offshore, but also in the territorial seas. The establishment of maritime zones (in particular EEZs) it is felt contribute to solve problems on the high seas and, indeed, it is difficult to see how MSP might work without EEZs and improved management and control which this brings together with improved co-operation and increased resources for control and monitoring (DG MARE 2011). In short, the principal conclusions with regard to MSP resonate with those emerging in the present study particularly with regard to fisheries and pollution control. With these elements in mind, it is unlikely that any current benefits are accruing from MSP beyond territorial seas but with the appropriate developments outlined above, including EEZs or its derivatives or by international agreements, the benefits identified in the above studies may be achieved.

## 12.3 Marine Strategy Framework Directive

The requirements of the Marine Strategy Framework Directive only apply to the EU Member States but effectively they address the obligation of all States to undertake conservation, as requested by UNCLOS, and also to achieve compliance with the Convention on Biodiversity to which, as already noted, all Mediterranean coastal States are party. Alongside the Marine Strategy Framework Directive (MSFD) the Member States also retain the obligation to cooperate with neighbouring countries within the respective sub-regions and in cooperation with regional conventions in defining marine strategies. For the Mediterranean work within this direction is carried out in the context of the Barcelona Convention and the application of

[272] Communication from the Commission to the European Parliament, the Council, the European Economic And Social Committee and the Committee Of The Regions, 17 December 2010, *Maritime Spatial Planning in the EU - Achievements and Future Development,* COM (2010) 771.

[273] (DG MARE 2011). Exploring the potential of Maritime Spatial Planning in the Mediterranean Sea, Final Report. Directorate-General for Maritime Affairs and Fisheries, MARE.E.1 'Maritime Policy Baltic and North Sea and Landlocked Member States February 2011

an ecosystem approach most aspects of which are enshrined in, or consistent with, the MSFD.

The Marine Strategy Framework Directive along with the Habitats and Birds Directives both deal with two particular responsibilities of Member States. The first is to create special conservation areas (SCAs), in relation to certain listed habitats or for certain listed species (Habitation Directive and Natura 2000 Network) or a coherent and representative network of marine protected area (the MSFD).

The second responsibility is to monitor the environment and undertake surveillance of the conservation status of habitat types (Habitats Directive) and to maintain 'a good environmental status' within marine waters which includes a initial assessment of that status and a monitoring programme to follow indicators towards establishment of status targets (MSFD).

Marine environments tend to be less well served by these directives than terrestrial systems. There is a network of MPAs in the Mediterranean of which a number are in the Natura 2000 network but all but one of these are within the territorial seas. It could be maintained that these directives should have no remit in high seas regions but, in fact, they should be applicable to the continental shelf which is, *de jure*, within national control.

Indeed, proceedings were brought in the European Court of Justice against the UK, which at the time did not have a full EEZ, in respect of the non-application of the Habitats Directive to the continental shelf area. However, in the Mediterranean the directives have never been pursued very actively in high seas areas because it was considered that boundaries of the shelf are yet to be agreed even though a number of the listed habitat types are found on the floor of the Mediterranean. Within an EEZ, or even an EPZ if appropriately defined, the water column does become subject to the directive requirements. This would be advantageous particularly since a number of the key species listed in Annex II, such as the harbour porpoise and bottle nosed dolphin (*Phocoena phocoena* and *Tursiops truncates*) and the loggerhead and green turtles (*Caretta caretta* and *Chelonia mydas),* are found across the open waters of the Mediterranean.

The creation of open sea MPAs have already been considered and valued (Section 10). It is worth reflecting however, that the model used is applied to the straits of Sicily which is directed at cetaceans (Section 10.3), including the porpoise and dolphin species mentioned above, and in the Ionian Sea which, as well as the cetaceans, will also help the conservation of loggerhead turtles (Section 10.3.3). Both examples of the model are completely consistent with the requirements of the directives. In fact, they are taken from a proposed network of high seas MPAs by RAC/SPAR and ACCOBAMS which aims to create a network of such reserves and the Mediterranean to protect cetaceans and migratory types including turtles and tuna-like species, exactly as intended by the directives. No doubt it is for this reason that the EU, as a third party, is supporting RAC/SPAR in this initiative. Certainly as far a control and protection is concerned, this would be reinforced if the MSs had the relevant of maritime zones in place which would provide a clear applicability of the directives. The costs and benefits of such MPAs have already been demonstrated to show significant incremental benefits (Section 9.3, Table 364 ).

The wider ecosystem and biodiversity assessment and monitoring also required by both the MSFD and the Birds and Habitats directive has not so far been included in the analysis. We have looked at control and monitoring of some factors which might affect biodiversity such as pollution (Section 7.2 ) and fisheries (Section 6.3.2) and their impacts evaluated through effects on ecosystem services, which includes the wider environment and biodiversity, but actual monitoring and assessment of ecosystems *per se* has not been considered in support of the directives.

The reason for this is that States do not uniformly perceive ecosystem monitoring as part of their sovereign remit and only Member States are subject to the directives dealt with above. However, if we do want to have some indications of the cost of monitoring and data collection then we can turn to our estimates of research capacity (Section 8.2 *et sequ*.).

Open sea monitoring is linked to open sea research capacity in that much of it involves sea-going vessels, largely in the public sector. The capacities for open sea research were complied and valued in Section 8 and the average value of research capacities available in each scenario per square kilometre of open water estimates (Section 8.3. 8.4, 8.5, 8.6). From this the average open sea research capacity available was:

| | |
|---|---|
| Gulf of Lion | 341 EUR/km$^2$ |
| Straits of Sicily: | 89 EUR/km$^2$ |
| Adriatic | 224 EUR/km$^2$ |

Supposing that States were prepared to put 10% of this capacity to maintaining and assessing ecosystems, some of which they may already do, then since we know the area of potential water area corresponding to scenario EEZs (Section 10) then the average cost for directive monitoring is given in Table 36.

**Table 36 Derived potential Directive Monitoring Costs by Scenario**

| | Directive Monitoring capacity* EUR/km2 | Potential EEZ area Km2 | Potential cost over EEZ area EUR million |
|---|---|---|---|
| Gulf of Lions | 34.1 | 200,555 | 6.8 |
| Straits of Sicily | 8.9 | 213,730 | 1.9 |
| Adriatic | 22.4 | 168,643 | 3.8 |

* assumes 10% of average open sea research capacity available for directive monitoring.
Includes requirements for both MSFD and Birds and Habitats directive and assumes the same responsibilities for the non-EU countries.

Although we feel it may not be appropriate to realistically include these costs in the overall scenario synthesis (Section 13) an ultimate comparison will show their relative magnitude against other elements in the synthesis.

# 13 Synthesis of cost benefit indicators of change in maritime zones

## 13.1 Summary of indicators

Following from the initial analysis of most likely legal impacts on rights and responsibilities resulting from changes in maritime zones six activities were identified as possibly being significantly affected. These were:

- Fisheries
- Vessel related pollution
- Conservation and open sea MPAs
- Research
- Surveillance
- Offshore renewable.

The main zones under consideration are those beyond the Territorial Seas primarily an extension to an EEZ, a Fisheries Protection Zone, an Environmental Protection Zone or high seas or open sea MPA. Only fisheries and offshore renewable energy are recognised sector of economic activity with readily monetarised costs and benefits although the impacts on renewable energy are concluded to be insufficient to enable a cost benefit analysis to be applied.

The other activities all have rather less tangible costs and benefits which rely on alternative valuations of effects and impacts. Such alternative values are sometimes referred to as 'shadow prices'. Consequently, most cost and benefits are indicators of these effects which have been put into a number of simple models that illustrate the relative magnitude of effects with and without the changes in maritime zone.

This is the operative intention of the analyses; to look at the relative magnitude of the effects on these activities as a means of testing aspects of policy and their applicability to maritime zones in the Mediterranean. Ultimately, this should provide a view on which, if any, of the zones might be changed and their relative advantages and disadvantages.

This has been done for the identified activities. However, the impacts on offshore renewable energy proved to be insignificant whilst analysis of surveillance was, for the most part, inappropriate on a cost benefit basis since the rights associated with an EEZ are, by definition, connected to activities with some economic implication rather than civil governance *per se*. Surveillance in relation to fisheries was something of an exception and did enable some examination of the interaction with maritime zones. A more qualitative approach has therefore been adopted with these activities (Sections 12 and 13).

In addition to the costs and benefits estimated for the impacted activities in Sections 6 to 9 there remains, one further overarching cost which is relevant to the declaration of new zones and particularly a full EEZ. This is the cost of negotiation with neighbours on precise limits and borders and can be regarded as the transaction cost. This has been considered already in the costs for setting up an MPA (Section 9.2.2). Using a similar approach to that employed for setting up MPA boundaries (Section 10.2.2) the responses in interviews with coastal states on the process negotiating agreements on maritime boundaries with their neighbours have been put together to give a model of the EEZ boundary negotiation process using some of the same unit costs as in Section 9.2.2. The scenario is based on information

relating to the negotiation on one joint border by one participant which might involve a team of 15-20 people over two years. The team would be civil servants (Table 37).

**Table 37 Model for negotiation cost of a joint border with a neighbour by one participant**

| Action | Days | Rate (EUR/day) | Total (EUR) |
|---|---|---|---|
| Legal planning | 55 | 180 | 9,900 |
| Country position | 120 | 180 | 21,600 |
| Meetings with neighbours | 230 | 180 | 41,400 |
| Drafting agreement | 45 | 180 | 8,100 |
| Ratification | 35 | 180 | 6,300 |
| *Sub-Total* | *485* | | *87,300* |
| Travel & other costs* | | | 19,207 |
| **Total** | | | **106,506** |

The result in Table 38 gives an indicative unit cost for negotiation of one border by one participant. The total cost of negotiating an EEZ would then depend upon how many borders need to be negotiated. The estimation of the full costs are shown in Table 38, however, the number of borders considered are restricted to those within the scenarios and do not include borders a participant might have outside the scenario.

**Table 38 Indicative negotiation costs between scenario countries**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania | Greece |
|---|---|---|---|---|---|---|---|---|---|---|
| **Border number** | **2** | **2** | **3** | **3*** | **1** | **4** | **5** | **3** | **3** | **2** |
| **Unit cost 106,506 (EUR)** | | | | | | | | | | |
| **Total (EUR millions)** | **0.21** | **0.21** | **0.32** | **0.32** | **0.11** | **0.43** | **0.53** | **0.32** | **0.32** | **0.21** |

* *includes Monaco*

The negotiation cost is clearly highly variable and the values in Table 38 can only indicate a level of magnitude. The negotiation costs can only be indicative because of their unpredictability in which sovereignty is a major issue. For example, an agreement reached over eight years between Albania and Greece on their maritime border could not be ratified by Parliament as it was challenged before the Constitutional Court.

The estimates above are based upon groups of reasonably cooperative neighbours but the one essential ingredient is political will. Without this the negotiation cost is infinite and becomes a deal breaker. There are a number of situations around the Mediterranean where negotiations are unlikely to proceed often on historical grounds.

Assuming that the political will is present in our scenario countries the indicative negotiation costs are included amongst the summary indicators taken from Sections 6 to 9 (Tables 39 and 40). In Case A in Table 39, and for Case B in **Error! Reference source not found.** are presented as evaluation matrices as rationalised in Section 5.4. This summary is for two cases. Both cases summarise the incremental benefits (monetarised total benefits minus total costs) of claiming an EEZ compared to the circumstances where the high seas predominate but due to the potential impacts from fisheries it is considered appropriate to present the summary of activity cost benefits with the present condition of the fisheries (Case A) and one in which the maximum economic yield from the stocks is approached

through sustainable management enabled by an EEZ as rationalised in Section 6.3.4 (Table 16).

**Table 39 Evaluation matrix and summary by country of incremental benefits with fisheries and only change in access rights with EEZ boundaries (Case A)**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania | Greece |
|---|---|---|---|---|---|---|---|---|---|---|
| **A. Fisheries Net Gain / Loss (€)** | **56.2** | **15** | **-73** | **-2.5** | **2.48** | **31,8** | **-57.2** | **1,64** | **-2.1** | **36.8** |
| **Research** | **-3.9** | **0** | **0** | **0** | **-1.62** | **0** | **-6.5** | **-0.92** | **-1.14** | **0** |
| **Conservation total** | **73.7** | **36.8** | **73.7** | **-** | **-** | **-** | **-** | **-** | **-** | **25.5** |
| Eco-services | 71.8 | 35.8 | 71.8 | - | - | - | - | - | - | 24.9 |
| Tourism | 1.9 | 0.94 | 1.9 | - | - | - | - | - | - | 0.65 |
| **EPZ value Total** | **25.6** | **56.9** | **249** | **243.4** | **899.7** | **140.7** | **214.5** | **8.0** | **12.4** | **34.3** |
| Eco-services | 6.7 | 6.4 | 19.4 | 23.4 | 63.7 | 7.8 | 42.3 | 1.3 | 2.6 | 2.6 |
| Tourism value | 18.9 | 50.5 | 230 | 220 | 836 | 133 | 172 | 6.7 | 10.7 | 31.7 |
| **Negotiation cost** | **0.21** | **0.21** | **0.32** | **0.32** | **0.11** | **0.43** | **0.53** | **0.32** | **0.32** | **0.21** |
| **Country totals** | **151** | **108** | **249** | **240** | **900** | **172** | **150** | **8.1** | **6.0** | **96** |
| **Scenario subtotal** | | **508** | | | **1140** | | | **432** | | |

**Table 40 Evaluation matrix and summary by country of incremental benefits with fisheries and sustainable management regime with EEZ boundary changes (Case B)**

| | Malta | Tunisia | Italy | France | Spain | Croatia | Italy | Montenegro | Albania | Greece |
|---|---|---|---|---|---|---|---|---|---|---|
| **B. Fisheries net total potential gain** | **70.2** | **160** | **62.3** | **29.9** | **10.3** | **138.3** | **82.1** | **3.1** | **3.9** | **67** |
| **Research** | **-3.9** | **0** | **0** | **0** | **-1.62** | **0** | **-6.5** | **-0.92** | **-1.14** | **0** |
| **Conservation total** | **73.7** | **36.8** | **73.7** | **-** | **-** | **-** | **-** | **-** | **-** | **25.5** |
| **Eco-services** | 71.8 | 35.8 | 71.8 | - | - | - | - | - | - | 24.9 |
| **Tourism** | 1.9 | 0.94 | 1.9 | - | - | - | - | - | - | 0.65 |
| **EPZ value Total** | **25.6** | **56.9** | **249** | **243.4** | **899.7** | **140.7** | **214.5** | **8.0** | **12.4** | **34.3** |
| **Eco-services** | 6.7 | 6.4 | 19.4 | 23.4 | 63.7 | 7.8 | 42.3 | 1.3 | 2.6 | 2.6 |
| **Tourism value** | 50.1 | 19 | 230 | 220 | 836 | 133 | 172 | 6.7 | 10.7 | 31.7 |
| **Negotiation cost** | **0.21** | **0.21** | **0.32** | **0.32** | **0.11** | **0.43** | **0.53** | **0.32** | **0.32** | **0.21** |
| **Country totals** | **165** | **253** | **384** | **272** | **906** | **279** | **289** | **9.9** | **14.8** | **127** |
| **Scenario subtotal** | | **802** | | | **1,178** | | | **718** | | |

It is worth bearing in mind that all of these values represent indicators the value of which have been determined or estimated from a variety of sources. The scenarios and there constituent countries are also rather varied including the availability of data. However the scenarios were selected to enable some examination to be made of the impacts of changing maritime zones over a range of geographical and political conditions (Section 5.4.2). In terms of assessing the relative costs and benefits, represented by the incremental benefit, of each type of maritime zone, the case for each of the derivative zones will be considered first and then the combined effect of declaring full EEZs.

Essentially, the Table 39 and **Error! Reference source not found.** represent the net incremental benefits for each impacted activity which includes those of fisheries, environmental protection and conservation which have given rise to derivative zones,

namely FPZs and EPZs or other maritime zones which are effected by EEZs largely the high seas/open sea MPAs. In terms of the original options to be tested (Section 5.1) the net incremental benefits represent the costs and benefits of Option 2 in relation to the baseline of Option 1, ie. no EEZ. Each activity line in the tables is therefore indicative of the net effects of the associated derivative zones which are considered separately below.

If the net incremental benefits from all activities are added together (whilst noting that some such as research introduce a net negative term) as in the final line, Scenario Totals, then this indicates the net monetarised benefits from the models that may be derived annually for each scenario by establishing EEZs, which equates to the increment between this Option 3 and the baseline Option 1.

As mentioned above, there are two cases for the fisheries activity the first (Case A), which represents potential gains and losses of fishing opportunities under present circumstances. Then Case B uses the resources rent indicator to examine the potential management bonus from stock recovery with adequate spending on control and monitoring and use of EEZ rights to establish a sustainable management plan. Such a management plan may be that offered by full implementation of the reformed CFP. These two cases are considered under the FPZ in Section 13.2 and put into perspective in relation to a full EEZ in Section 13.6.

## 13.2 Fishery protection zone (FPZ)

Considering the situation when limits of an FPZ are declared which subsume all fisheries access rights within the boundaries creates a view denoted by line A in Table 39. Some countries gain benefits through gaining access rights and some lose benefits. In the model six countries show a net gain in benefits from acquired access rights and five a net loss. Principally, it is those countries with extensive wide ranging fleets, notably Italy, which have the capacity to use most effectively the free access to high seas fisheries that will lose immediate access to these sources. Other States to lose out are those with narrow shore lines, like Albania, which limits claims to an EEZ compared to their current access to all high seas areas.

Those that gain are those who currently do not fully utilise their current opportunities either because of the marketability of the species in question or because they do not have a limited fisheries sector in terms of means or intention.

It is important to understand that the model only refers to rights of access. Once EEZs are claimed such rights can be traded for reciprocal rights with neighbouring countries or rented to other States but this represents a cost and also has a negotiation cost attached to it.

Negotiation or transaction costs are considered when considering the situation of a full EEZ below.

States within the EU may find that under the CFP there is recognition of historical rights which might mitigate against the effects of the acquisition of fishing rights by certain other Member States. This mitigation through rights being protected by other Member States seems to be worth about 7.5% of the value of the rights in question (Section 6.3.3). This could be taken as the value added of being a member of the EU in the fisheries sector.

With States taking more control of fisheries within their EEZ they may chose to extend that control over the new zone as indicated by the appraisal of surveillance in Section 10. In addition, they may also extend their data collection and monitoring to improve their understanding of the acquired resource rights. This clearly involves additional costs which have been estimated (Sections 6.3.1, 6.3.2). If these costs are subtracted from the

incremental changes in the value of the rights then the negatives are further emphasised (Table 14 and Table 15). When these costs are taken into account then only three countries gain and seven show negative benefits. In other words the additional costs of control and monitoring more than offset the vale in rights gained or add to the losses.

A more detailed consideration of fisheries surveillance and control in Section 10 using Joint Deployment Programmes as an example suggested that, in fact, deployment on the high seas might make detection more efficient due to flexibility of movement for inspection although there other factors which limit this flexibility. However, the rights gained by the coastal State for enforcement would render control and enforcement potentially much more effective either in supervising observation the access rights or enforcing the requirements of a management plan.

On this basis an FPZ is of questionable value or of value only in specific cases where countries have not been taking full advantage of the high seas resources through management. However, one of the reasons for taking control of those resources is to increase their potential productivity which previously might have been eroded by the relatively open access offered by the high seas. Whilst it is true that the majority of fisheries are subject to the international GFCM, the fact remains that its data bases and analytical capacity are more limited compared to ICES, for example, and it is also an advisory body with no real means of exercising control and regulation. A coastal State with an FPZ would be better able to exercise this control and regulation in support of that advice, particularly if it also included a policy specifically directed at sustainable management of the fishery and the industry.

To illustrate the potential gains that can be made through stock recovery and effective management plans the index known as the resource rent is used (Section 6.3.4), which also includes an element resulting from improved efficiency and effectiveness of the downstream value added sector typically observed as accompanying such sustainable management policies (e.g. World Bank 2008). The potential benefits from such measure when fully realised are shown for the stocks whose access rights would fall into the FPZs of the scenario countries (line B in Table 16).

These are all highly positive and rather higher than any gains from access rights indicating the general value of sustainable management. It is in the achievement of this management policy that the increases in control and data collection costs become paramount. These costs are relatively small compared to the benefits offered by sustainable management (Table 16). If the indicator of benefits from sustainable management, the resource rents are added to the indicator of the value access rights resulting from boundary changes to give gross value from which the costs of control and monitoring are subtracted then an overall index of incremental or net benefits is found (Table 16; **Error! Reference source not found.** line B). The net benefits remain overwhelmingly positive and in those cases which showed a positive benefit from the change in access rights alone the benefits with sustainable management can be five to ten times higher.

***Policy overview***

To create a policy which only allows for creation of the limits for an FPZ with its implications for acquiring or changing access rights appears to be of marginal benefit or even a dis-benefit for those countries with wide ranging fleets who may trigger reciprocal actions. Increasing control may help maintain those access rights but may further negate any economic benefits. Imposing an FPZ just to keep other people out is not necessarily a worthwhile option although there can be qualitative objectives such as those of the Spanish FPZ where the intent appeared to be mainly to preserve nursery areas and to protect the livelihoods.

Creating an FPZ as part of an enabling action for a sustainable management policy, alongside a solidifying of access rights shows considerable benefits. To implement this also requires the extended control for enforcement and data collection to service the management plan but even after these are taken into account the benefits remain substantial (**Error! Reference source not found.**). There can be significant socio-economic benefits via increased employment opportunities (Section 6.5).

It is to be expected that the reformed CFP may form the basis of such a sustainable management policy if rolled out *in toto* across Member States waters in the Mediterranean. Currently many aspects of the CFP are not in place in the Mediterranean including neither a TAC process nor a move to a version of rights-based management. One reason for this could be exactly because they could only be applied to the Territorial Seas whilst many of the stocks are not confined to these.

The models used above also give policy pointers to States in different positions. For example, the picture provided by Table 39 suggests that countries which secure fishing access rights beyond their present catching abilities or requirements, such as Tunisia, and Malta, might build into their policy either an intent to build up new capacity of an appropriate nature or a negotiating position for trading the rights with the existing users. Conversely, those with wide ranging fleets who stand to lose rights, such as Italy, might want to write a substantial commitment for negation into theirs or their proxy within the EU policy. This would be equally important for smaller countries such as Albania. Never the less, the overarching requirement for an effective sustainable management policy remains in order to optimise benefits.

## 13.3 Environmental protection zone (EPZ)

An EPZ is largely directed at controlling marine pollution which in the high seas comes largely from waste released from vessels (Section 7). This waste is often oil but not always. Of vessel related pollution incident off the coast of France 56% was hydrocarbon based the remainder being due to a variety of hazardous materials (CROSSMed 2009, 2010). The model for the functioning of an EPZ is derived initially from the experience of France in relating the number of pollution incidents and the effectiveness of the EPZ in reducing these to the estimated traffic in larger vessels which cause these incidents. Such incidents are given a value derived from the bails and fines imposed upon polluters by the French State as a deterrent and an indication of the determination of the State to reduce this source of pollution. This in turn can be taken as a measure of the value the State puts upon keeping its seas clean and the ecosystem services which the sea provides, intact. Increasing pollutants in the water can make seas and beaches unhealthy and unsightly which can undermine other sectors which depend upon clean seas including fisheries, mariculture and tourism. The control envisaged is more related to reducing the persistent, often intentional discharges which constitute the chronic build up of pollutant in the water rather than the one off events linked to unpredictable accidents.

The benefits modelled are of two types. Firstly, the intrinsic value of the clean sea as valued by the State in its determination to prevent the damage to ecosystem services such as support to fish communities and the amenity value. A crucial element in this, in the example of France, was the declaration of the EPZ with the rights under UNCLOS which shifted the power to penalise towards the coastal State, rather than the flag State, and thus enabled the French State to impose and enforce appropriately high fines and bail, i.e. its values, on the polluters. These are used to put a value on those intrinsic services.

The second area of benefit is to examine the magnitude of losses that might occur if clean seas are threatened by pollution in terms of a build up of hazardous chemicals in the water and its effects, for example upon bather and divers and the unpleasant consequences of slicks at sea and tar on the beaches and the general impact on the competitiveness of the tourism sector. This is not a direct benefit that is gained by declaring an EPZ. It is a benefit at risk if effective control is not imposed. In other words, the EPZ is an insurance policy. The sector which has been included is tourism since this can be notoriously fickle in people's choice of destination and there is any number of alternative destinations these days.

The summary of these two lines of benefit assured by the EPZ are both substantial (Table 39). In estimating the value of the EPZ in terms of its intrinsic value to ecosystem services it was noted that the effectiveness of the EPZ in the case of France was a reduction in risk from pollution 91% as measured by the reduction in pollution incidents (Section 6.2). Basically it was reduced to levels more consistent with those of the Atlantic coasts where EEZs prevail.

The ecosystem service values for the EPZ appear lower than that from the tourism at risk. This is largely due to the importance of coastal tourism as an economic sector (Table 22). This is particularly the case in some countries including Italy, Spain and France and this is reflected in the huge contribution from tourism.

The costs of an EPZ are largely envisaged as coming from an effective surveillance and control system (Section 9.2.1). As with control in the case of fisheries, the effectiveness of control derives from the rights the coastal State gains by claiming the zone.

Summing the two lines of benefits and the costs gives the total incremental benefits shown in **Error! Reference source not found.**.

***Policy overview***

The magnitude of incremental benefits derived from an EPZ are substantial. The French instance shows that pollution incidents can be controlled and that central to this is the more direct powers of enforcement enabled by the EPZ. Again, however, as with fisheries it really needs to be backed with an effective surveillance system but the costs of this are small compared to the benefits.

Given that the impacts on tourism can be significant it is particularly important for countries with a large coastal tourism sector to consider an EPZ since so much is at risk (Table 39). In this respect it is significant that in our interview with the Foreign Ministry in Croatia it was stated that Croatia was determined to keep its seas clean because of its tourist industry and this was the primary reason behind their declaration of an EFPZ.

It should also be borne in mind that tourism is not the only economic sector that is underpinned by clean seas.

## 13.4 High seas MPA

The major objective of an MPA is conservation which is one of the least tangible and difficult areas to examine on a cost benefit basis. To do this we have relied upon value systems developed for environmental economics which arose as a discipline specifically to ecosystems and conservation into a monetarised main stream economics (e.g. IUCN 1998; TEEB 2010[274]). The main benefits in this scheme of values are seen to be in conserving the

[274] (TEEB 2010). The TEEB Synthesis Report Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB, 20 October 2010, CBD COP10, Nagoya. 36pp.

services provided directly or indirectly to the economy and civil society. The services relevant to high seas MPAs are laid out in Section 9.2.4 which are derived from the approach of Plan Bleu (2010) and their recent analysis of the services provided by the open water habitat of the Mediterranean.

A number of high seas MPAs have been proposed, which would represent new zones in the Mediterranean, but only one, the PELAGOS cetacean sanctuary has been agreed an implemented. The costs and benefits associated with this have been used to develop unit values which are then extrapolated to two MPAs which have been proposed in areas coincident with our scenarios. The benefits assessed include ecosystem services such as carbon sequestration and the support services to maintain fisheries (Table 35) as well as the amenity value added from tourism. The ecosystem services conserved by a marine MPA are similar to those protected by the EPZ, which the State values, the tourism component, however, is different. The EPZ controls the clean water which maintains ecosystem services and prevents degradation which may be expressed as a threat to tourism. The tourism value in the EPZ model is therefore a risk of loss if pollution is not controlled. In a conservation zone, flagging its status can enhance new tourist opportunities as demonstrate by the PELAGOS template (Section 9.2.6) and therefore represents a direct economic gain.

A further benefit of flagging such a conservation area is what is termed the indirect use benefit. Essentially, this is money given by third party institutions, often public sector, to support the conservation effort and to know that it happens. For example, the EU and the WWF give funds to support the high sea MPA programme of RAC/ SPAR which is thus an indirect benefit, or investment into the process.

The costs are clearly an annual operating cost, which includes monitoring, but also the cost of negotiating the agreement between partner States to set the zone up. The negotiating cost is a one off start-up cost which can be brought into the analysis, which is based an annual values, by depreciating the cost over a 10 year period to arrive at an annual value at least over this period. The negotiating costs are estimated on a per country basis therefore the total negotiating cost for the MPA is a product of the number of partner countries involved. The incremental benefits after costs are subtracted are shown in Table 39 and **Error! Reference source not found.**.

***Policy overview***

The net benefits from the two MPAs modelled are substantial particularly given the low costs which are some 50 time less than the benefits (Table 34). As with the EPZ such a zone underpins the value of the sea itself as well as adding directly to the tourism sector. Never the less the value of the ecosystem services exceeds the tourism benefits (Table 39) thus emphasising the fundamental contribution of conservation through an MPA on the underlying support system of the sea.

The added value from tourism is based on the effects around the PELAGOS but data from Greece has suggested the potential benefits may be higher. It is also probably the case that a high seas MPA may benefit from including a stretch of coastline by giving the businesses on the shore and the local population, a more direct stake in the MPA.

Establishment of an open water MPA can be implemented on the high sea as indicated by the existence of the PELAGOS and, as such, should be promoted. However, control remains a problem as indicated by the incident relating to intrusive research into underwater warfare directly targeted at PELAGOS by NOAA. It is also impossible to have a non-extractive or regulated fishing policy in the reserve except for coastal State flagged vessels. PELAGOS was started initially with a view to prevention of the impacts of tuna drift netting on whales. This was banned by the partner countries but other fishing is unaffected and third parties

might still be able to use the method. In addition, the much of the same vessel traffic which is currently controlled by the EPZ of France also passes across the whole PELAGOS sanctuary a proportion of which is beyond its jurisdiction and therefore not subject to such strict controls. As it happens, the surveillance system in place by CROSSMed does extend over most of PELAGOS and the general discipline imposed by the France EPZ spills over but, in other locations, a high seas MPA would only have the weak rights of control of the partner States unless it was also in an EPZ or EEZ.

It is the improved rights of control from an EPZ, FPZ and EEZ which is a unifying factor and an MPA in conjunction with any of these would be synergistic if done in conjunction with an integrated control system. In this way, the control costs could be spread over three types of activities and benefits with resulting economies.

In the case of the EU, setting up open sea MPAs is consistent, or even a requirement of the Marine Strategy Framework Directive. This is examined further below.

## 13.5 Integrated Maritime Surveillance

A common feature of the three zones discussed above is the need for surveillance, monitoring and control. It has been suggested that by looking at the needs for all three it should be possible to find some synergy and cost savings by providing more integration which might express itself more clearly if all the rights are exercised together in an EEZ as outlined in the next section. However, as was clear in the derivation of the EPZ model from the experience of France (Section 9) and the analysis of surveillance as conducted by Joint Deployment Programmes for fisheries that there are two rather more fundamental commonalities in the surveillance and control process. There is detection of transgressions and there is enforcement of compliance with the regulations. In the case of France whilst there was a long history of efficient detection it was only when, using the powers gained from an EPZ, more direct action could be brought to bear on polluters and appropriate penalties enforced that pollution incidents from this source declined. In Section 12, it was described how JDPs in the Mediterranean where sharing of means did provide some flexibility in deployment (Table 35) because of not being restricted by EEZs although other factors intervened to lower inspection rates and compliance was much lower than in the Atlantic where EEZs have prevailed.

This presents something of a paradox where the lack of EEZs may enhance the efficiency of detection but the lack of regulating powers reduces effectiveness of control.

Clearly a cross border integrated approach to detection with the appropriate zones in place for control would help solve this conundrum. Integrated Maritime Surveillance is one of the three overarching factors in the EU Maritime Policy, along with MSP and the MSFD, and as such can be directed at ways and mechanisms for achieving this. The indices in Table 35 give some view of the magnitude of efficiencies that might be aimed at with an Integrated Surveillance programme.

***Policy overview***

An integration of surveillance, which underpins most of the potential benefits found here to result from changes to maritime zones, would appear to increase the efficiency of this activity. The problems are, however, significant and hinge around what inspectors can do and can't do in another countries maritime zone and the extent that other country vessels or overflights are agreed. In other words much of this comes back to sovereignty. The benefits are there but the costs are political.

## 13.6 Full EEZ and priorities

The indicative costs and benefits and their policy implications have been considered above for the derivative zones which make use of specific sectoral rights and responsibilities that UNCLOS provides for that specific sector. The ultimate option is to have all the right combined together in an EEZ. Table 39 and **Error! Reference source not found.** show the relative incremental benefits from all the activities identified by the legal analysis as impacted by the changes in judicial status of an EEZ. The relative magnitude of the incremental benefits may offer a basis for prioritising which single zones to promote first if the full EEZ package is not an option. The tables also include the one overall cost of a full EEZ, the negotiation or transaction cost. Against the background of the benefits gained this cost is very small if the political will is there.

**To allow a synthesis of the overall picture the scenario summaries have been brought together by activity category from Tables 38 and 39. This has been done for the two fisheries cases examined the first where the limits simply allow access rights changes (Table 41) and the second where these are accompanied by a sustainable management plan from which the necessary costs for control and data collection have been subtracted to give the potential net total benefit from responsible management**

Table 42. These have also been represented by pie charts in Figure 26 and Figure 27 respectively to illustrate better the proportional contribution of the activities to each case.

**Table 41 Summary of annual incremental benefits by activity category with change in fishing access rights alone (EUR million)**

| Category | Scenario | | | |
|---|---|---|---|---|
| | Sicily Straits | Lions Gulf | Adriatic | Net benefit |
| Fishery EEZ limits | - 1.8 | - 0.02 | 10.9 | 9.1 |
| Research | -3.9 | -1.6 | -8.6 | -14.1 |
| EPZ | 332 | 1,143 | 410 | 1,885 |
| Conservation (MPA) | 184 | | 25.5 | 210 |
| Total Benefit of EEZ | 510 | 1,141 | 450 | 2,090 |

**Table 42 Summary of annual incremental benefits by activity category with change in fishing access rights plus sustainable management (EUR million)**

| Category | Scenario | | | |
|---|---|---|---|---|
| | Sicily Straits | Lions Gulf | Adriatic | Net benefit |
| Fishery EEZ management | 293 | 40.2 | 294 | 627 |
| Research | -3.9 | -1.6 | -8.6 | -14.1 |
| EPZ | 332 | 1,143 | 410 | 1,885 |
| Conservation (MPA) | 184 | | 25.5 | 210 |
| Total Benefit of EEZ | 805 | 1,182 | 721 | 2,708 |

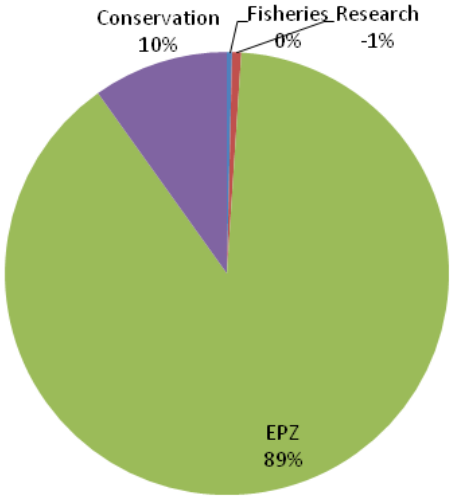



**Figure 26 Incremental benefits with fishing limits alone**

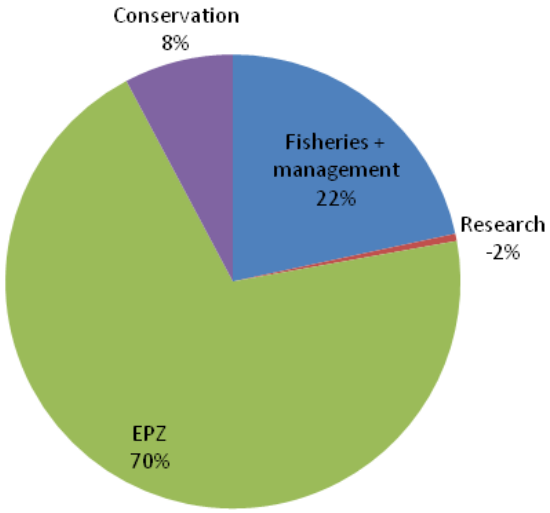



**Figure 27 Benefits with management**

The only activity which shows a net negative value is Research due to an overall loss of access rights but, even so, the effect is very small in the overall picture.

In the overall synthesis the contribution of fishing in case A, where only the limits and access are changed, fisheries contributes very little to the overall benefits, less than 1% (Figure 26). This in fact is a representation of the fact that there are only so many access rights and therefore, over a scenario net gains more or less offset net losses. The real differences are felt at country level. When a sustainable management policy, enabled by the EEZ, is in place the fisheries can contribute almost a quarter of the benefits (Figure 27, case B).

In both cases, however, by far the largest contribution comes from the pollution control offered by the environmental protection element. However, by far the greatest proportion of this contribution comes from the tourism risk element which contributes on average 90% to these benefits. Again, there are significant differences at country level since this proportion is obviously dependent upon the magnitude of the tourist industry in the country and is skewed by two or three major country industries.

In some countries fisheries can be the major contributor if fully managed. Thus, for example, for Tunisia fisheries can contribute some 63% of the total benefits, Croatia 49% and Malta 42% (from **Error! Reference source not found.**) suggesting that some countries might have a greater stake in claiming an FPZ rather than and EPZ. These benefits come from both a significant gain in access rights as well as well as the potential from sustainable management. In fact, Malta gains 37% from the gain of access rights alone (from Table 39).

Conversely, the value from the EPZ depends upon the proportion of the sector is deemed to be at risk, put at 5% here (Section 7.4.2), but this does not change the picture that physical and chemical pollution to pose a definite risk to a volatile sector which could result in a serious drop in revenue if not controlled. The benefit is the insurance against this risk.

It does seem of fundamental significance that the single activity which appears to make the greatest single contribution is environmental protection through control of vessel related pollution and its effects of the ecosystem services which underpin both the fundamental support system of the sea and the region's largest sector in the coastal economy. The relationship between tourism and pollution should be further investigated.

The rights regarding control are also relevant to the fisheries and conservation sectors. Within an EEZ there may be cost savings by having integrated control systems such as already exist in some States. These costs have not been included *per se* in the conservation model mainly because the existing template largely exists under the umbrella of an existing EPZ but such a cost may need to be added in other circumstances where an open sea MPA is initiated within a new EEZ or EPZ unless an integrated control is introduced.

Conservation has been considered largely in the light of creating a new zone, the open sea MPA. There may be wider responsibilities. The Marine Strategy Framework Directive suggests that as well as a responsibility for setting up MPAs, Member States should also assess and monitor their ecosystems. This is also true for fisheries where the CFP requires monitoring and data collection for management. No cost for this wider scale monitoring has been included but could be inferred by using a fraction the average research capacity available in each scenario (Table 30) although this would only be appropriate in cases where coastal States took their responsibilities for monitoring their biodiversity and habitats seriously. Again, there may be some cost savings available from synergy between the fisheries and conservation sectors to the extent where open water fisheries surveys in support of the CFP might also include some sampling for conservation monitoring, particularly given the adoption of the ecosystem approach to management a process which has already commenced.

In Section 12.3 we looked at the case of extending the Marine Strategy Framework Directive across new EEZs. This would have its costs some of which would be expressed in setting up open sea MPAs but analysis of this activity shows that benefits considerably exceed costs (Table 35). Some possible estimates were also obtained for extending biodiversity monitoring into EEZ areas (Section 9.3.3), however, when compared with the overall benefits shown by conservation alone (Table 41) these can be seen as very small.

In terms of a measure of the overall benefits of an EEZ it can be seen that, in both of the fisheries cases this can be obtained by adding the incremental benefits of all the rights pertaining to each on the activities identified. It can be seen that for both fisheries cases these are positive for every country (Table 39 and **Error! Reference source not found.**). Across all the scenarios these amount EUR 2.1 billion per year for the first case (Table 41) and EUR 2.7 billion per year if the full benefits from sustainable management of fisheries are realised. These do seem significant benefits overall.

***Policy overview***

Having applied a cost benefit approach for the rights gained from a full EEZ it appears there are significant benefits that might justify this providing the political will is there amongst countries and their neighbours? These benefits considerably exceed the costs to yield substantial incremental benefits. The use of an EEZ rather than one of the derivative zones is likely to offer synergy and costs saving efficiencies with regard to control and possibly monitoring and data collection.

If an EEZ is not appropriate then the single most significant zone would be an EPZ or an FPZ providing effective management was exercised. It is probably significant that this appears to have already been the conclusion amongst several States judging by the number who have claimed fisheries zones, an EPZ or both. The EEZ, however, would still appear better value with the total benefits being almost twice those of an EPZ or six times that of a fully effective FPZ (Table 38).

There is every reason to promote open sea MPAs and increased biodiversity monitoring in keeping with conservation requirements of UNCLOS or with policy requirements such as the Marine Strategy Framework Directive. Both direct and indirect economic benefits result.

The fact remains that, although the models used in the analyses in the previous sections are testing the value of presence or absence of EEZs or derivative zones, coastal States in the Mediterranean are increasingly, both *de facto* and *de jure*, assuming their rights under UNCLOS. The apparent flexibility offered by the high seas is already becoming constrained. A regular feature of the interviews conducted with coastal States is the regular insistence that, irrespective of their views on the claims of their neighbours, they really don't want to provoke disputes and will go to some lengths to avoid it. This is the type of tolerance the coastal States of the Mediterranean have had centuries of practice at to ensure the maintenance of the equilibrium they all depend on.

Perhaps the time has arrived to regularise the situation which otherwise becomes a mosaic of rights and constraints. There are incremental benefits to be had in many of the cases examined above but it is also clear that merely claiming maritime zones under UNCLOS, mainly as a badge of sovereignty, does not necessarily yield those benefits. Those benefits have to be earned. This is shown most clearly in the case of fisheries where the claiming of a zone and imposing a well conceived management regime can convert a marginal, or even doubtful benefit, into very positive economic, as well as ecosystem, range of benefits. Equally, the linking of other zones to proper control and monitoring is equally a pre requisite for the full realisation of the incremental benefits compared to costs.

# Appendix 1 Existing and potential maritime zone areas relating to the case studies

These were generated from a computer model using the median line principle between countries and have no implications for claims historical or future. The estimates are taken from the median line algorithm of the Global Maritime Boundaries Database[275]

| Country | EU | Territorial Sea Km2 | EEZ Km2 |
|---|---|---|---|
| **Spain** | Y | 55196 | 147020 |
| **France** | Y | 24467.24 | 53535 |
| **Monaco** | N | 73.02 | 214.2 |
| **Italy** | Y | 154578 | 383550 |
| **Croatia** | N | 31510 | 23848 |
| **Montenegro** | N | 2320 | 4093 |
| **Albania** | N | 6106 | 5098 |
| **Greece** | Y | 114000 | 38770.7 |
| **Malta** | Y | 3990 | 44020 |
| **Tunisia** | N | 36880 | 41860 |

275 275 http://www.gd-ais.com/index.cfm?acronym=gmbd

# Appendix 2 Cost-benefit model working progress

**Worked Example- France – Gulf of Lions**

The data from the GCFM database for the catches of the French fleet Gulf of Lions for 2008 by species is shown below to indicate how the total is compiled. For the full model average prices per type of fish have been obtained from contemporary market sources to enable a value to be obtained. To complete the scenario the same exercise is conducted from the catches of the Spanish fleet in the Gulf of Lions area.

The GCFM does not collect bluefin tuna data thus this has been included using ICCAT data as described in Section 6.1.

**Total catches by French flagged vessels within the GFCM Gulf of Lions Area. Source: GFCM FISHTAT Capture Database 2008**

| Country | Species | Division | Total Catch (t) |
|---|---|---|---|
| France | European pilchard(=Sardine) | Gulf of Lions | 6,777 |
| France | European anchovy | Gulf of Lions | 4,138 |
| France | European hake | Gulf of Lions | 1,965 |
| France | Octopuses, etc. nei | Gulf of Lions | 1,140 |
| France | Atlantic mackerel | Gulf of Lions | 696 |
| France | Poor cod | Gulf of Lions | 462 |
| France | Atlantic horse mackerel | Gulf of Lions | 433 |
| France | Various squids nei | Gulf of Lions | 384 |
| France | Gilthead seabream | Gulf of Lions | 302 |
| France | Mullets nei | Gulf of Lions | 269 |
| France | European seabass | Gulf of Lions | 228 |
| France | Red gurnard | Gulf of Lions | 226 |
| France | European conger | Gulf of Lions | 217 |
| France | Marine fish nei | Gulf of Lions | 943 |

**Table 43 Allocation of the proportion of French catch in the Gulf of Lions by species taken in each of the different zones**

| Country | Species | Division | Proportion | | | |
|---|---|---|---|---|---|---|
| | | | TS | FZ | FR EEZ | ES EEZ |
| France | European pilchard(=Sardine) | Gulf of Lions | 0.8 | 0 | 0.2 | 0 |
| France | European anchovy | Gulf of Lions | 0.7 | 0 | 0.2 | 0.1 |
| France | European hake | Gulf of Lions | 0.7 | 0 | 0.2 | 0.1 |
| France | Octopuses, etc. nei | Gulf of Lions | 1 | 0 | 0 | 0 |
| France | Atlantic mackerel | Gulf of Lions | 0.5 | 0 | 0.49 | 0.01 |
| France | Poor cod | Gulf of Lions | 0.55 | 0 | 0.4 | 0.05 |
| France | Atlantic horse mackerel | Gulf of Lions | 0 | 0 | 0.9 | 0.1 |
| France | Various squids nei | Gulf of Lions | 0.7 | 0 | 0.29 | 0.01 |
| France | Gilthead seabream | Gulf of Lions | 1 | 0 | 0 | 0 |
| France | Mullets nei | Gulf of Lions | 0.5 | 0 | 0.49 | 0.01 |
| France | European seabass | Gulf of Lions | 0.7 | 0 | 0.29 | 0.01 |
| France | Red gurnard | Gulf of Lions | 0.55 | 0 | 0.4 | 0.05 |
| France | European conger | Gulf of Lions | 0.7 | 0 | 0.2 | 0.1 |
| France | Marine fish nei | Gulf of Lions | 0.9 | 0 | 0.09 | 0.01 |

**Table 44 Catches taken by French fleet in the Gulf of Lions in each of the different zones by species**

| Country | Species | Division | Catch | | | |
|---|---|---|---|---|---|---|
| | | | TS | FZ | FR EEZ | ES EEZ |
| France | European pilchard(=Sardine) | Gulf of Lions | 5421.6 | 0 | 1355.4 | 0 |
| France | European anchovy | Gulf of Lions | 2896.6 | 0 | 827.6 | 413.8 |
| France | European hake | Gulf of Lions | 1375.5 | 0 | 393 | 196.5 |
| France | Octopuses, etc. nei | Gulf of Lions | 1140 | 0 | 0 | 0 |
| France | Atlantic mackerel | Gulf of Lions | 348 | 0 | 341.04 | 6.96 |
| France | Poor cod | Gulf of Lions | 254.1 | 0 | 184.8 | 23.1 |
| France | Atlantic horse mackerel | Gulf of Lions | 0 | 0 | 389.7 | 43.3 |
| France | Various squids nei | Gulf of Lions | 268.8 | 0 | 111.36 | 3.84 |
| France | Gilthead seabream | Gulf of Lions | 302 | 0 | 0 | 0 |
| France | Mullets nei | Gulf of Lions | 134.5 | 0 | 131.81 | 2.69 |
| France | European seabass | Gulf of Lions | 159.6 | 0 | 66.12 | 2.28 |
| France | Red gurnard | Gulf of Lions | 124.3 | 0 | 90.4 | 11.3 |
| France | European conger | Gulf of Lions | 151.9 | 0 | 43.4 | 21.7 |
| France | Marine fish nei | Gulf of Lions | 848.7 | 0 | 84.87 | 9.43 |
| Total | | | 13425.6 | 0 | 4019.5 | 734.9 |

**Table 45 Estimated catch value (€/t) of species taken by the French fleet in the Gulf of Lions**

| Country | Species | Division | Estimated Value (€/t) |
|---|---|---|---|
| France | European pilchard(=Sardine) | Gulf of Lions | 556 |
| France | European anchovy | Gulf of Lions | 3,502 |
| France | European hake | Gulf of Lions | 4,512 |
| France | Octopuses, etc. nei | Gulf of Lions | 3,009 |
| France | Atlantic mackerel | Gulf of Lions | 822 |
| France | Poor cod | Gulf of Lions | 1,266 |
| France | Atlantic horse mackerel | Gulf of Lions | 2,660 |
| France | Various squids nei | Gulf of Lions | 2,250 |
| France | Gilthead seabream | Gulf of Lions | 3,250 |
| France | Mullets nei | Gulf of Lions | 1,385 |
| France | European seabass | Gulf of Lions | 12,943 |
| France | Red gurnard | Gulf of Lions | 696 |
| France | European conger | Gulf of Lions | 1,254 |
| France | Marine fish nei | Gulf of Lions | 1,000 |

**Table 46 Estimated total catch value (€) taken by the French fleet in the Gulf of Lions by species and zone**

| Country | Species | Division | Value (€) | | | |
|---|---|---|---|---|---|---|
| | | | TS | FZ | FR EEZ | ES EEZ |
| France | European pilchard(=Sardine) | Gulf of Lions | 3,012,035 | 0 | 753,009 | 0 |
| France | European anchovy | Gulf of Lions | 10,143,863 | 0 | 2,898,247 | 1,449,123 |
| France | European hake | Gulf of Lions | 6,206,774 | 0 | 1,773,364 | 886,682 |
| France | Octopuses, etc. nei | Gulf of Lions | 3,430,168 | 0 | 0 | 0 |
| France | Atlantic mackerel | Gulf of Lions | 285,984 | 0 | 280,264 | 5,720 |
| France | Poor cod | Gulf of Lions | 321,660 | 0 | 233,935 | 29,242 |
| France | Atlantic horse mackerel | Gulf of Lions | 0 | 0 | 1,036,496 | 115,166 |
| France | Various squids nei | Gulf of Lions | 604,693 | 0 | 250,516 | 8,638 |
| France | Gilthead seabream | Gulf of Lions | 981,500 | 0 | 0 | 0 |
| France | Mullets nei | Gulf of Lions | 186,317 | 0 | 182,591 | 3,726 |
| France | European seabass | Gulf of Lions | 2,065,748 | 0 | 855,810 | 29,511 |
| France | Red gurnard | Gulf of Lions | 86,513 | 0 | 62,918 | 7,865 |
| France | European conger | Gulf of Lions | 190,483 | 0 | 54,424 | 27,212 |
| France | Marine fish nei | Gulf of Lions | 848,700 | 0 | 84,870 | 9,430 |
| **Total** | | | **28,364,438** | **0** | **8,466,443** | **2,572,315** |

# Appendix 3 Estimates of Resource Rents for Mediterranean fisheries

Estimated with sustainable catch equivalent to 60% of landed value achieved and 35% increase from value added (World Bank 2008).

| Country | 2008 catch | 2009 catch | Resource Rent 08 (potential) EUR | Resource Rent 09 (potential) EUR |
|---|---|---|---|---|
| **Albania** | 3,320 | 3,625 | 6,803,676 | 7,428,713 |
| **Algeria** | 138,862 | 127,949 | 284,570,716 | 262,205,886 |
| **Bosnia and Herzegovina** | 5 | 5 | 10,247 | 10,247 |
| **Croatia** | 49,017 | 55,365 | 100,450,743 | 113,458,470 |
| **Egypt** | 88,883 | 89,001 | 182,147,932 | 182,389,749 |
| **Israel** | 2,545 | 2,545 | 5,215,469 | 5,215,469 |
| **Lebanon** | 3,541 | 3,541 | 7,256,571 | 7,256,571 |
| **Libyan Arab Jamahiriya** | 47,650 | 52,116 | 97,649,145 | 106,801,934 |
| **Monaco** | 1 | 1 | 2,049 | 2,049 |
| **Montenegro** | 1,701 | 1,701 | 3,485,859 | 3,486,269 |
| **Morocco** | 35,754 | 40,581 | 73,270,262 | 83,162,643 |
| **Palestine, Occupied Tr.** | 2,843 | 1,525 | 5,826,160 | 3,125,183 |
| **Montenegro** | | | 0 | 0 |
| **Syrian Arab Republic** | 3,212 | 3,107 | 6,582,352 | 6,367,175 |
| **Tunisia** | 96,836 | 96,680 | 198,445,400 | 198,125,914 |
| **Turkey** | 453,107 | 424,730 | 928,552,175 | 870,399,189 |
| **Cyprus** | 1,991 | 1,385 | 4,080,156 | 2,838,281 |
| **France** | 21,909 | 19,073 | 44,897,704 | 39,086,914 |
| **Greece** | 86,039 | 80,614 | 176,320,337 | 165,201,860 |
| **Italy** | 223,060 | 240,974 | 457,115,833 | 493,828,018 |
| **Malta** | 1,279 | 1,595 | 2,621,055 | 3,268,634 |
| **Spain** | 105,364 | 102,421 | 215,922,240 | 209,891,970 |
| **TOTAL** | 1,493,299 | 1,483,084 | 3,060,217,026 | 3,039,284,041 |
| **EU** | 440,333 | 446,936 | 902,374,827 | 915,905,330 |
| **EU %** | 29.49% | 30.14% | 29.49% | 30.14% |
| **French price 2008** | 2530 | 2530 | Capitalised at 8% | |

# Appendix 4 Estimating vessel passages for cost-benefit model – vessel source pollution

### France and Spain

A starting point is to look at the number of passages between the most frequent routes between ports (Table 47) and also from total number of port calls by vessels >100DWT to major ports in the region (Table 48). These are derived from REMPEC (2008), Lloyds Register and port websites.

**Table 47 Number of passages between the most frequent routes between ports**

| Rank | Origin | Destination | 2006 Voyages | 2010 Voyages |
|---|---|---|---|---|
| 1 | Barcelona | Palma (Maj) | 1532 | 1409 |
| 2 | Olbia | Leghorn | 1488 | 1428 |
| 3 | Leghorn | Olbia | 1472 | 1413 |
| 4 | Palma (Maj) | Barcelona | 1442 | 1326 |
| 5 | Barcelona | Valencia | 1126 | 1036 |
| 6 | Nador | Almeria | 1091 | 1047 |
| 7 | Almeria | Nador | 1081 | 1037 |
| 8 | Igoumenitsa | Bari | 998 | 958 |
| 9 | Genoa | Barcelona | 983 | 904 |
| 10 | Bari | Igoumenitsa | 972 | 933 |
| 11 | Palma (Maj) | Ibiza | 893 | 857 |
| 12 | Genoa | Porto Torres | 893 | 1027 |
| 13 | Palma (Maj) | Valencia | 891 | 820 |
| 14 | Valencia | Palma (Maj) | 882 | 811 |
| 15 | Leghorn | Bastia | 860 | 826 |
| 16 | Bastia | Leghorn | 845 | 811 |
| 17 | Porto Torres | Genoa | 845 | 972 |
| 18 | Ibiza | Palma (Maj) | 833 | 808 |
| 19 | Valencia | Barcelona | 795 | 731 |
| 20 | Marseille | Algiers | 791 | 656 |

A further source of the records are the number of port calls in the most frequently visited ports (Table 48).

**Table 48 Number of port calls by vessels >100DWT in 2006 and 2010**

| Port | 2006 | 2010 |
|---|---|---|
| Marseille | 3612 | 3004 |
| Barcelona | 9112 | 8410 |
| Gibraltar | 6822 | 8118 |
| Genoa | 6924 | 7995 |
| Venice | 4480 | 4246 |
| Leghorn | 6952 | 6589 |
| Valencia | 5776 | 5325 |
| Alexandria | 4802 | 4658 |
| Algeciras | 4844 | 4699 |
| Piraeus | 4712 | 4570 |

In general , there has been something of a reduction in the number of passages between 2006 (REMPEC 2008) and 2010 although some have increased such as calls at Gibraltar,

largely due to transit oil transport passages across the Mediterranean to Suez and the Black Sea .

The data in the tables above can be used to help indicate the total number of vessel passages through the maritime zones of the countries in the scenarios from which indications of the possible environmental cost of the threat to their seas and of the relative effectiveness of an EPZ can be derived using the indicators derived from the model of France.

The first requirement is to estimate an index of transit numbers through country waters from the above estimates in Table 49 and Table 50.

**Table 49 Numbers of some transit and port calls in France in 2010**

| | |
|---|---|
| Genoa - Barcelona | 904 |
| Genoa – Porto Torres | 1027 |
| Porto Torres* | 972 |
| Marseille | 3004 |
| Barcelona (%France)* | 4205 |
| Genoa (% France)* | 3990 |
| Barcelona/Genoa | 904 |
| Fos | 3446 |
| Port de Bouc | 180 |
| | 18,632 |

***** *corrected for transit calls*

Of these some 11,425 within the sample might be expected to pass through the Corsica Channel or the Bouches de Bonifacio (eg. Genoa-Barcelona) and therefore to be included in the absolute number of passages recorded by CROSS Med (2010) of some 24,670. Consequently the indicator can be calibrated as accounting for the ratio between those passages estimated from the sample of ports data and that from surveillance, i.e. 46.3%. This can then be used as a raising factor between the indicator totals and a representation of the actual numbers of passages.

**Spain**

**Table 50 Numbers of some transit and port calls in Spain 2010**

| | |
|---|---|
| Barcelona – Palma | 1409 |
| Palma - Barcelona | 1326 |
| Barca - Valencia | 1036 |
| Genoa - Barca | 904 |
| Palma - Ibiza | 859 |
| Palma - Valencia | 820 |
| Valencia - Palma | 811 |
| Ibiza - Palma | 808 |
| Valencia - Barca | 731 |
| Total | 8704 |

With respect to Spain, the number of port transits estimated from the routes above for Barcelona was 4,765 whilst the total number of port visits actually recorded in 2010 was 8,410 (Table 48) thus 55% have been captured in the sample . Similarly for Valencia estimates from the routes are 3398 as opposed to 4246 (i.e. 80%) known of total port calls. These two ports therefore allow a calibration of the samples from the routes which amount, on average to be 64% of the recorded total which therefore gives a raising factor for Spain. Using this, the total transit index for Spain is 13,578 passages through Spanish waters.

**Straits of Sicily/Malta**

Using the same sources, in 2006 the total transits were 64,000 (REMPEC 2008) which by 2010 had risen to some 73,000.

**Table 51 Sample numbers of transits and port calls in Straits of Sicily**

| | |
|---|---|
| Transits | 72,960 |
| Naples | 4,264 |
| Igomet - Bari | 1,916 |
| | |

Total non-transit in sample is 6186 but represents only 35% of all calls from ports in the area thus total non-transit is 17,657. These together with the total transit passages mean the total passages within the scenario are some 90,617.

**The Adriatic**

Post calls for major ports in the region from port websites are shown below

**Table 52 Sample numbers of transits and port calls in the Adriatic**

| | |
|---|---|
| Venice | 4246 |
| Ancona | 4382 |
| Ravenna | 4368 |
| Trieste | 395 |
| Total | 13,391 |

The numbers given for Ancona, Ravenna and Trieste are largely based on oil and gas transports. These ports account for 85% of oil and gas trade in the Adriatic (REMPEC 2008) which means the total is close to 15,754. The ratio of oil/gas transports to leisure and general transport vessels in Venice indicates a further 30% for these passages which an overall total of 20,953 passages for larger vessels.

# Appendix 5 Workings for research model – cost-benefit model for marine research

The table below has been constructed from CIESM Database updated from current institutional databases and EurOcean Research Vessel Database276. One or two institutions only provided total staff (labelled '%' above) but in the scenarios these have been adjusted adjusted for scientific/support by taking average from totals in the table which is support staff being 42% of total, and applying this.

**Table 53 Resarch Staff and vessels across scenarios as indicators of research capabilities**

| | FT Scientists | others | Vessels >12 m | AOL m | Vessels <12 m | |
|---|---|---|---|---|---|---|
| **Adriatic** | | | | | | |
| *Croatia* | | | | | | |
| Institute For Marine And Coastal Research<br><br>University Of Dubrovnik | 24 | 3 | 1 | 31m | | |
| Institute Of Oceanography And Fisheries<br><br>Split | 78 | 19 | 1 | 36m | 1 | 10.8m |
| *Montenegro* | | | | | | |
| Institute Of Marine Biology, Kotor | 20 | 17 | 0 | | 1 | 8 |
| *Greece* | | | | | | |
| Laboratory Of Hydrobiology, Athens | 2 | 1 | | | | |
| Hellenic Centre For Marine Research, Institute of Oceanography, Athens * | 134 | %tot | 2 | 62m, unknown | | |
| HCMR, Institute of Marine Biological Resources, Athens * | 37 | | | 62m, unknown | | |
| HCMR, Institute of Marine Biology, Heraklion * | 25 | | | 62m, unknown | | |
| *Eastern Italy* | | | | | | |

[276] http://www.rvinfobase.eurocean.org/spec/index.jsp?mode=0

| | FT Scientists | others | Vessels >12 m | AOL m | Vessels <12 m | |
|---|---|---|---|---|---|---|
| CNR, Ancona F/O/C | 28 | 13 | 2 | 33m, 16m | | |
| Laboratorio Di Biologia Marina, Bari F/C | 15 | 20 | | | 1 | |
| Centro Ricerche Marine, Cesenatico | 10 | 4 | 1 | 17 | | |
| Laboratorio Di Biologia Marina E Pesca, Fano F/C | 6 | 4 | 1 | | | |
| DOGA, Trieste O | 20 | 10 | 1 | | | |
| CNR, Istituto Talassografico Di Trieste C | 8 | 7 | | | | |
| Laboratorio Di Biologia Marina, Trieste | 10 | 2 | 1 | 17 | | |
| Istituto Di Chimica, Valenzano C | 5 | 7 | 0 | | 0 | |
| ISMAR Venice – CNR O | 47 | 25 | | | 3 | 7<br>10 |
| Istituto Di Biologia Del Mare, Venice | 18 | 15 | 1 | 24 | 1 | 7 |
| Istituto Sperimentale Talassografico, Tarranto | 10 | 11 | 1 | 14.5 | | |
| | | | | | | |
| *TOTAL* | 523 | 168 | 11 | | 8 | |
| | | | | | | |
| **Gulf of Lions** | | | | | | |
| *France* | | | | | | |
| Banyuls S/Mer Observatoire Océanologique C | 79 | 34 | 1 | 14m | 1 | 7m |
| Laboratoire IFREMER de Toulon -La Seyne S/mer **C | 11 | 3 | 1 | | 1 | 5.6m |

| | FT Scientists | others | Vessels >12 m | AOL m | Vessels <12 m | |
|---|---|---|---|---|---|---|
| Centre d'Océanologie De Marseille – CNRS O/C | 120 | 65 | 1 | | 3 | |
| Station ifremer expérimentale d'aquaculture - Palavas | 16 | 17 | 0 | | | |
| CEFREM, University of Perpignan O? | 26 | 8 | | | 3 | |
| Station Ifremer De Sète | 25 | 15 | 0 | | | |
| Station Méditerranéenne De L'environnement Littoral, Sete C | 7 | 5 | 0 | | 1? | 7.6m, |
| Institut Océanographique Paul Ricard C | 10 | 8 | 0 | | 2 | |
| Observatoire Océanologique, Villefranche | 93 | 90 | 0 | | 2 | 8.5, unknown |
| *Spain* | | | | | | |
| Institut D'ecologia Litoral, Alicante C | 10 | 4 | | | 2 | 4m, |
| Marine Biology Research Laboratory, Alicante | 8 | 8 | | | 2 | 03-May |
| GRC Geociències Marines, Barcelona | 7 | 3 | | | | |
| Institut De Ciencies Del Mar, Barcelona O | 319 | 36 | 1 | | | |
| Centro De Estudios Avanzados De Blanes C | 107 | % | | | 6 | 10.4, others unknown (maybe ribs) |

| | FT Scientists | others | Vessels >12 m | AOL m | Vessels <12 m | |
|---|---|---|---|---|---|---|
| Instituto Mediterraneo De Estudios Avanzados<br><br>Imedea, Mallorca C | 165 | % | | | 4 | |
| Centro Oceanografico De Malaga - I E O O | 28 | 20 | 3 | 66.7m, 30.5m, 24.0m | | |
| Instituto Andaluz De Ciencias De La Tierra | 87 | 55 | 2 | 80 | | |
| Centro Oceanografico De Baleares - I E O | 45 | 9 | 2 | 22.5m, 30.5m | 1 | 5.6m |
| Centro Oceanografico de Murcia - I E O C | 4 | 15 | | | | |
| Instituto De Ciencias Marinas De Andalucia C | 25 | 10 | | | 1 | |
| Centro Oceanografico De Murcia - I E O O | 19 | 45 | | | 2 | |
| Laboratory Of Marine Zoology, Valencia C | 19 | 5 | | | | |
| | | | | | | |
| TOTAL | 1219 | 452 | 11 | | 23 | |
| | | | | | | |
| **Straits of Sicily** | | | | | | |
| *Southern Italy* | | | | | | |
| Cnr - Messina C | 24 | 16 | | | 2 | |
| Istituto Di Meteorologia E Oceanografia, Napoli | 11 | 11 | 1 | | | |
| Stazione Zoologica "Anton Dohrn", Napoli | 50 | 50 | 1 | 19 | | |
| Icram, Roma C | 98 | % | | | 3 | |
| Irepa, Salerno | 15 | 10 | 0 | | 0 | |

| | FT Scientists | others | Vessels >12 m | AOL m | Vessels <12 m | |
|---|---|---|---|---|---|---|
| Dipt Di Ecologia Marina, University Messina O/C | 23 | 2 | 1 | 27 | | |
| Istituto Sperimentale Talassografico, Tarranto | 10 | 11 | 1 | 14.5 | | |
| *Malta* | | | | | | |
| University Marine Laboratory, Malta C | 6 | 7 | 0 | | 0 | |
| *Tunisia* | | | | | | |
| INISTM, Salammbo F/O | 79 | 121 | 1 | 33.7m | | |
| | | | | | | |
| ***Total*** | 316 | 228 | 4 | | 5 | |

*% - indicates that the institution only records the total staff so an average percentage will need to be applied to separate the two.*
*** 2 departments, only personnel information for one of these departments.*

Example of derivation of research capacity totals from above data.

**Table 54 Derivation of the research sector indicators for the Adriatic**

| | Unit Cost (EUR 000) | Scientists | Others support | Vessels >12m | Vessels <12m | Total (EUR mill) |
|---|---|---|---|---|---|---|
| | | | | | | |
| ***Offshore units*** | | 291 | 133 | 11 | | |
| Vessel (EUR mill) | 2.4 | | | 26.4 | | |
| Scientist (EUR mill) | 44.8 | 13.04 | | | | |
| Support (EUR mill) | 32 | | 4.256 | | | |
| *Sub Total* | | 13.04 | 4.26 | 26.4 | | 43.7 |
| ***Inshore units*** | | 148 | 116 | | 9 | |
| Vessel (EUR mill) | 0.425 | | | | 3.825 | |
| Scientist (EUR mill) | 0.00448 | 6.63 | | | | |
| Support (EUR mill) | 0.0032 | | 3.712 | | | |
| *Sub Total* | | 6.63 | 3.712 | | 3.825 | 14.6 |

The unit costs can then be applied to these totals to monetarise the capacities.