



**National Strategy and Action Plan
for the Conservation of the
Mediterranean Monk Seal in Greece, 2009-2015**



Report on evaluating the past and structuring the future

Athens, 2009



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PART ONE

BACKGROUND INFORMATION

1. Executive Summary

This summary of the Strategy document refers to Part One, which provides background information useful to understand the rationale at the basis of the formulation of the “New Strategy”, Part Two that describes the evaluation of the implementation of the “1996 Strategy” and Part Three that presents the elaboration of the new National Strategy for the Conservation of the Mediterranean Monk Seal in Greece, for the period 2009 - 2015.

Part One of the document opens with a brief update on the current status of *Monachus monachus* in Greece. The species is still widely distributed across the nation’s coastal area, being still found everywhere but in very small numbers. The minimum population size of monk seals surviving in Greece is believed to be slightly in excess of 210 individuals, down from an estimate of 360 in the late 1970s. Nevertheless, >34 pups are thought to be born every year. In three areas where monitoring was carefully carried out in recent years, pup production was seen to be slowly but steadily increasing. Amongst mortality causes, deliberate killing by fishermen strongly affects adult seals, whereas many inexperienced juveniles drown in fishing nets. Both factors are considered responsible for the species’ lack of recovery in the country.

An overview of the national, European and international legal instruments introduced to protect Mediterranean monk seals reveals that there is no shortage of provisions, at all levels, to support the species’ conservation and recovery in Greece. It can be assumed that if correctly implemented and effectively enforced, the existing legislation would afford the species and its habitat a level of protection sufficient for its population(s) to recover. Nevertheless, due to failed enforcement of national and European legal provisions, monk seal recovery in Greece during the past decades has not occurred. Illegal fishing (including fishing with explosives) and overfishing routinely occurs in Greece throughout the species’ range, including in areas containing monk seal critical habitat; individual monk seals continue to be killed, and yet perpetrators have rarely been identified and prosecuted; human encroachment across the nation’s coastal zone continues unabated, including in portions of the seals’ critical habitat; areas that are well-known today as breeding sites for the species still lack any type of protection; other similarly important sites are protected only on paper, without effective enforcement conducted. Even the systematic monitoring of incidental captures and killings of monk seals, mandatory for all European Member States under the provisions of the Habitat Directive, is left to the initiative of NGOs rather than being resourced and/or carried out by the competent institutions. Adherence to most international agreements and conventions explicitly requiring protection of Mediterranean monk seals and their habitat testifies Greece’s formal commitment to the species’ protection on the international scene. This, however, clashes resoundingly with a disappointing lack of factual commitment in terms of direct, practical and effective action, in stark contrast with the achievements of NGOs working for monk seal conservation. Similarly, countless workshops and meetings which were held during the past four decades, bringing together scientist and managers to discuss monk seal conservation actions, achieved no significant results in terms of halting the overall decline of the species.

In 1996 a “Strategy for the protection of the Mediterranean monk seal *Monachus monachus* in Greece” was proposed by two Greek NGOs, “Archipelagos - Marine and Coastal Management”, and “MOM / Hellenic Society for the Study and Protection of the Mediterranean Monk Seal”. The Strategy identified ten “tools” available to monk seal conservation in Greece: establishment and effective management of “special conservation areas”, reduction of human-caused mortality related to fisheries, information to and education of the public, research on the species’ biology and ecology, rescue and rehabilitation, reduction of pollution, reduction of overfishing, improvement and enforcement of legislation, breeding in captivity, and translocation.

Part Two of this document summarizes the lessons learned from a critical analysis of the accomplishments and shortcomings of such effort during the past decade.

Formal legal establishment of marine protected areas is a difficult, expensive and time-consuming effort which requires, amongst other key issues, conquering the local human communities to the cause. In spite of many proposals and of few notable achievements (e.g., the National Marine Park of Alonnisos and the Northern Sporades, the Milos protected area and the inception of legal protection in North Karpathos), an overview of place-based protection of the species in Greece reveals that the most important monk seal areas have remained and still are without any legal and effective form of protection. Most of the achievements in protecting marine areas were obtained through NGO activism, with strong support from the European Commission; in stark contrast, national institutional support to the establishment of MPAs in monk seal habitat was mixed at best, and obstructive in several instances.

Such meagre results are particularly disappointing if one considers that amongst the two actions singled out in the "1996 Strategy" having highest priority – habitat conservation and reduction of fishery-caused mortality – only the first was vigorously addressed by NGOs due to limited available human and financial resources, most of which were invested in the protection of important populations and habitats. Interactions with fisheries were seen as a daunting issue and therefore the problem was somewhat left on a slower track, until the 2005 "MOFI" project brought the issue to the forefront. Such action is now considered of the greatest importance, under the assumption that most of the factors that are responsible for the decline of Mediterranean monk seals derive from human activities that are unsustainable and/or illegal (e.g., overfishing, illegal fishing, illegal killing of seals, combined habitat degradation). Thus the future of monk seals will depend in large part on Greece having the political will to take responsible and precautionary action to mitigate such known anthropogenic threats.

One of the greatest achievements of the "1996 Strategy" concerns the advancement of scientific knowledge relevant to conservation, which compared to now was rather scant and rudimentary only ten years ago. This probably occurred because the involved organisations, in spite of the inherent difficulties in studying such a rare and elusive marine mammal, were able to proceed at their own pace without the disadvantage of the obstructive interactions with institutions, organisations and stakeholders involved in management and conservation matters. Also the rescue and rehabilitation of wounded, sick and orphaned animals was a very successful aspect of monk seal conservation carried out by NGOs during the 1996-2008 period, with the rehabilitation and release of 15 individuals, although many problems remain in terms of the expertise and equipment needs, finances, and logistics.

Compared to the present dangers posed to monk seals by locally acute conflicts with fisheries and habitat destruction, so far pollution has been taking the back stage in the frame of the species' conservation efforts. This however may change soon, particularly in view of the opening, forecast for 2011, of the Bourgas - Alexandroupolis pipeline, which will make available for shipping up to 53 million tons of oil per year in the Northern Aegean, and open the region to the possibility of a major environmental catastrophe. Concerning the problem of prey depletion caused by intense fishing, during the 1996-2008 periods no direct initiatives took place. This is rather unfortunate given the wide level of over-exploitation of fishing resources in Greece, and the implications of such condition for monk seal conservation. However, a specific action plan is currently being developed within the framework of the "MOFI" project, and included within the framework of the "New Strategy".

To conclude the analysis of the "1996 Strategy", almost thirteen years after its launch the species' conservation status has changed little: monk seal killings still frequently occur in Greece, and most monk seal critical habitats still lack effective protection. The Strategy was an excellent and comprehensive document, ahead of its times, and certainly cannot be saddled with the responsibility for such failure. The main problem lies with the fact that the Strategy advocated actions (in

particular, establishing protected areas and dealing with direct killings) that fall within the exclusive competence of the State's governing authorities, which will act (or not act) on the basis of their autonomous decision process, policies, and priority setting. It is now becoming apparent that a more pragmatic attitude should involve an effort of implementing good science-guided governance at a local level (i.e., within the coastal communities that live and work in monk seal habitat), striving to harmonise humans with the marine ecosystems in which they exist. This should stimulate the development of local, ecosystem-based management systems capable of engendering sustainability and coexistence with the monk seals, and provide, insofar as possible, opportunities to central governmental bodies for not being as obstructive of the conservation process as they have been during the recent past. A more vigorous local action, and a greater emphasis in addressing the seal – fishery interactions, would therefore seem the most important lessons learned from the experience of the "1996 Strategy".

Part Three is dedicated to an explanation of the reasons and rationale that led to the formulation of the "New Strategy". The Strategy is articulated over a seven-year period, and four mutually reinforcing objectives are devised to reach the goal. To be effective, the Strategy will have to implement coordinated monk seal conservation actions targeting Hellenic society principally at two different levels: local and national. At the local level, the areas identified as containing monk seal breeding habitat, i.e., where pupping still regularly occurs, provide a unique opportunity for the establishment of "cells of excellence" where the various conservation activities are implemented through a virtuous blend of community participation, the application of solid science, wise governance, mutual trust and economic vision. Such important areas for monk seals should be singled out as demonstration cases - where monk seal strongholds can be strengthened, seal groups maintained and made to grow, local communities made to become stewards of the marine environment and of monk seals as its flagships – and used to propagate within Greece, and elsewhere where monk seals still occur, a winning recipe for the species' stewardship. Models, albeit still imperfect, of such cases already exist (e.g., Karpathos), and should be improved with full institutional support, and replicated elsewhere. Ideally, the leading role in such processes should gradually migrate from specialised, centrally-based NGOs to local constituencies, tightly connected with the local realities but still operating within rigorous conservation, governance and ethical standards. This would leave to centrally-based NGOs the equally vital functions of strategic coordination and support. At the national level, saving the monk seal from extinction should become the engine of a national effort, involving everyone, to restore the Greek marine environment to its pristine status.

The document concludes with the strong conviction that it is still possible to save the Mediterranean monk seal, in spite of its poor conservation status. *Monachus monachus* continues to be fully entitled to its *Critically Endangered* Red List category, just as it was declared by IUCN more than 13 years ago. The species' overall trend is still negative, and there are no clear signs of its recovery anywhere in the Mediterranean. However, against expectations, the small breeding groups of seals still existing in Greece (and to a smaller extent in Turkey) provide a strong reason for hope. The roadmap for the species' recovery – outlined here – is quite clear; legal provisions could not be more favourable; ecological and veterinary knowledge, although incomplete, is substantive and helpful; threats are well identified, and the measures to address them straightforward. Unfortunately, the political advantages of saving Mediterranean monk seals, and conversely the political costs of letting them become extinct, may not have been fully grasped yet by the relevant sectors of Hellenic society. This "New Strategy" should be embraced nationally as a best practice example, and solidly integrated within a wider strategy for the conservation of the marine environment in Greece. Ideally, the monk seal should become the symbol of a renewed effort towards marine conservation in the country.

2. Acronyms and abbreviations

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
CBD	Convention on Biological Diversity
CIESM	International Commission for the Scientific Exploration of the Mediterranean Sea
CITES	Convention in International Trade in Endangered Species of Fauna and Flora
CMS	Convention on Migratory Species
COP	Conference of the Parties
CV	Coefficient of variation
EC	European Commission
EU	European Union
FRI	Fisheries Research Institute
GO	Governmental organisation
IMO	International Maritime Organisation
IUCN	International Union for the Conservation of Nature
MAP	Mediterranean Action Plan
MOFI	Monk Sea and Fisheries (LIFE Programme)
MOm	Hellenic Society for the Study and Protection of the Mediterranean Monk Seal
MPA	Marine protected area
MSCC	Monk Seal Conservation Commission
NGO	Non-governmental organisation
NMPANS	National Marine Park of Alonnisos and the Northern Sporades
NTZ	No-take zone
Photo-ID	Photo-identification
PR	Public relations
PSSA	Particularly Sensitive Sea Area
RAC/SPA	Regional Activity Centre/Specially Protected Areas
RINT	National Monk Seal Rescue and Information Network
SAC	Special Area of Conservation
SCI	Site of Community Importance
SES	Special Environmental Study
SSC	Species Survival Commission
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environmental Programme
WCPA	World Commission on Protected Areas
WTP	Willingness to pay

3. Summary of the current status of Mediterranean monk seals in Greece¹

3.1. Distribution. In Greece, Mediterranean monk seals are still widely distributed throughout the coastal zone, showing a preference for isolated, rocky and remote coastal areas (Adamantopoulou et al. 1999). The available data indicate that in most areas the surviving monk seal populations² are very small compared to existing colonies on the Atlantic coast of north-western Africa.

The best studied seal concentrations until now are those found in the wider area of the National Marine Park of Alonnisos, Northern Sporades (NMPANS; Dendrinis et al. 1994, 1999), and the one inhabiting the island complex of Kimolos – Polyaigos in the south-western Cyclades (MOM 2005). Other important breeding groups have been found in the area of Northern Karpathos – Saria in the southern Dodecanese (MOM 2005), in Zakynthos - Kefalonia in the Ionian Sea (Panou et al. 1993), and, more recently, on the island of Gyros in the northern Cyclades (Dendrinis et al. 2008).

Within the framework of the operation of the National Rescue and Information Network (RINT; Adamantopoulou et al. 1999) and the ongoing long-term monitoring activities of local monk seal concentrations in different areas within Greece, MOM has mapped the known occurrence of the species within the country. The density of monk seal sighting reports transmitted to MOM between 1996 and 2006 is presented in Fig. 1³.

3.2. Population size. The oldest estimate of the total numbers of the Mediterranean monk seal in Greece, presented in 1977 by Marchessaux and Duguy, ranged between 260 and 360 individuals (Table 1).

Area	Minimum estimate	Maximum estimate
Continental Greece	20	30
Northern Sporades	30	50
Ionian Islands	30	40
Cyclades Islands	70	90
Dodecanese Islands	80	100
Crete and adjacent islands	30	50
Total	260	360

Table 1 - First Mediterranean monk seal estimates from Greece (Marchessaux & Duguy, 1977)

It must be noted, however, that reliable estimates and trends of Mediterranean monk seal numbers in Greece were at the time, and still are, a daunting task, considering: (a) that few hundred seals are spread over a coastline longer than 15,000 km, fragmented in more than 3,000 islands and islets; (b) the cryptic behaviour of the species; and (c) the difficulty of applying to monk seals traditional marine mammal monitoring methods such as mark-recapture studies based on photo-identification (e.g., Hammond 1986, Forcada and Aguilar 2000). As a result, any estimate of the total population size of seals living in Greece must still be considered very approximate.

By contrast, more accurate population estimates for local seal concentrations in Greece were generated through systematic long-term monitoring efforts in the field (consisting mostly in the

¹ This section was contributed in large part by MOM.

² Considering the lack of in-depth knowledge of the population structure of the species in the Mediterranean, the term "population" is used throughout this document *sensu lato*.

³ This map is not effort-corrected, so it does not necessarily reflect relative monk seal density in Greece.

monitoring of the seals' terrestrial habitat and in recording annual pup production), in four specific locations:

1. The area of the Northern Sporades (since 1990);
2. The area of Kimolos–Polyaigos in the Cyclades (since 1997);
3. The area of Karpathos–Saria in the Dodecanese (since 1997);
4. The area of Gyaros island in the Cyclades (since 2004).

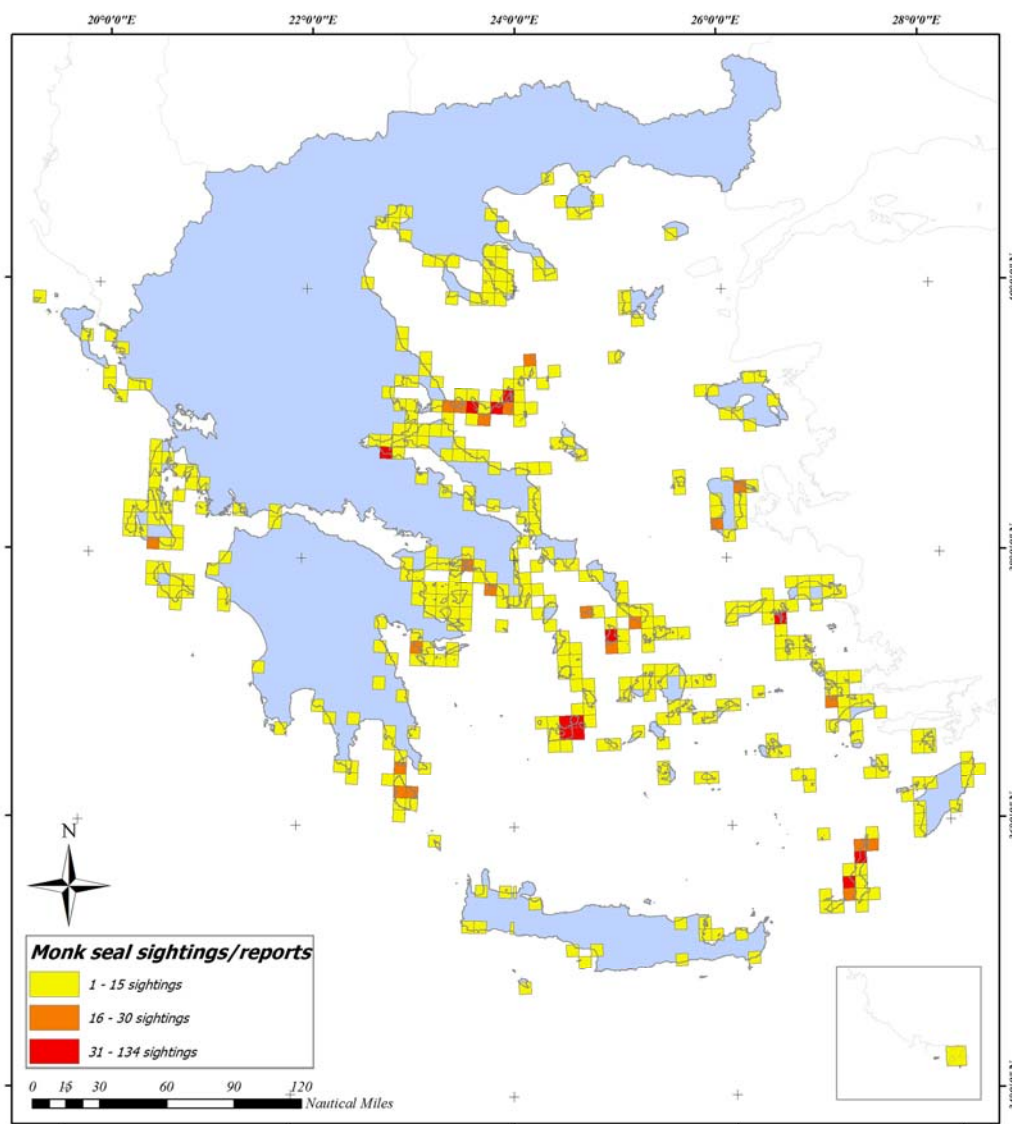


Fig. 1 - Monk seal reports in Greece, 1996-2006 (UTM 10x10km grid). Courtesy of MOM

The most detailed, long-term study of a monk seal population in Greece was carried out in the Northern Sporades, where individual monk seal identification was based on the collection of information through direct observations, drawings, photographs and videos from remotely-controlled cameras (Dendrinos et al., 1999). This combined data analysis from 1991-2006 resulted in the identification of a minimum of 50 individuals (except newborn pups) with a mean annual pup production of eight.

In need of more precise estimators, the resulting ratio of 6.2:1 (i.e., 6.2 identified individuals - newborn pups excluded - for each pup produced in any year) may be tentatively used (MOM, pers. comm.) as a crude index to predict the size of other local monk seal populations within Greece, where over a number of years and applying the same methodology, annual pup production is being closely monitored. This ratio is conservative, comparable to similar ratios found in other Mediterranean monk seal locations, where similar monitoring and identification studies were carried out (Table 2).

Area	Pop. estimate (except newborn)	Annual pup production	Ratio	Source
Mauritania (before 1997)	317	51	6.2:1	Gazo et al., 1999
Mauritania (after 1997)	109	25	4.4:1 ⁴	Gonzalez et al., 2002
Madeira, Portugal	20	3	6.6:1	Neves & Pires 1998, Pires et al. 2007
Cilician Basin, Turkey	22	2	11:1	Gucu et al., 2004
Foça, Turkey	9	1	9:1	Güçlüsoy & Savas 2003
Northern Sporades, Greece	50	8	6.2:1	Dendrinou et al. 1999

Table 2 - Mediterranean monk seal population estimates vs. pup production.

To estimate the sizes of three other monk seal concentrations in Greece, i.e. those found in the Kimolos – Polyaigos, in Karpathos – Saria and in Gyaros, all of which yielded detailed and reliable pup production data for extended periods, the 6.2:1 ratio was applied, considering that there was no evidence of difference in basic demographic parameters between such areas and the Northern Sporades, where the ratio was generated. Results of the estimates are given in Table 3.

Area	Mean annual pup production	Pop. estimate (except newborn pups)
Northern Sporades	8.4	52
Kimolos – Polyaigos	7.9	49
Karpathos – Saria	3.7	23
Gyaros	7.0	43
Sub-total	27	167
Rest of Greece	7.4	46
Total	34.4	~ 213

Table 3 - Monk seal population estimates in Greece

Apart from the field surveys and the long-standing monitoring programs in the four areas listed in Table 3, Mediterranean monk seal births have been recorded also throughout the national coastal area through RINT (the National Monk Seal Rescue and Information Network). The mean annual pup production recorded from 1997 to 2006 (included) was 7.4. Following the same methodology as above, this number corresponds to a total of 46 individuals of various age classes, newborns excepted. Therefore, given that the overall mean annual pup production recorded in Greece from 1997 to 2006 was 34.4, and based on the 6.2:1 ratio, a total monk seal population estimate for Greece can be placed at around 213 individuals (MOM, pers. comm.).

⁴ Birth rate sharply increased after a severe 1997 mass mortality event.

This estimate, however, is very conservative, and should only be considered an absolute minimum. Monk seals are very widespread across the Greek national coastal waters and other promising locations, still unexplored, are likely to exist.

3.3. Population trends. Reports of Mediterranean monk seals in Greece indicate that during ancient and historic times the species was widely distributed along the islands and the coasts of the continental part of the country (Johnson and Lavigne 1999, Johnson 2004, Aguilar and Lowry 2008), perhaps with the exception of the semi-enclosed Amvrakikos Gulf. Unfortunately, no data exist on the sizes of Mediterranean monk seal populations in those times. Many of the aforementioned reports describe the extensive use of open beaches by large colonies of the species. It appears however that the systematic extermination of the species during Hellenistic and Roman times had already decimated to a large degree monk seals throughout the Mediterranean. During the 19th and 20th centuries the hunting of the species continued unabated, and resulted in a further reduction of population sizes and a restriction of its range. Consequently, monk seals now mostly persist in remote, difficult to access areas possessing well-protected coastal caves, adequate for breeding and resting. Although these circumstances have led to the extirpation of the species throughout most of the Mediterranean basin, monk seals are still widely distributed in Greece, albeit in much smaller numbers than in the past.

In more recent times, detailed data on pup production in three important monk seal areas in Greece (17 years in the Northern Sporades; 10 years, respectively, in the Kimolos-Polyaigos and Karpathos-Saria areas) show a positive recruiting trend (Fig. 2), providing strength to the conviction that the implementation of a concrete a conservation strategy may still allow the recovery of the species in Greece.

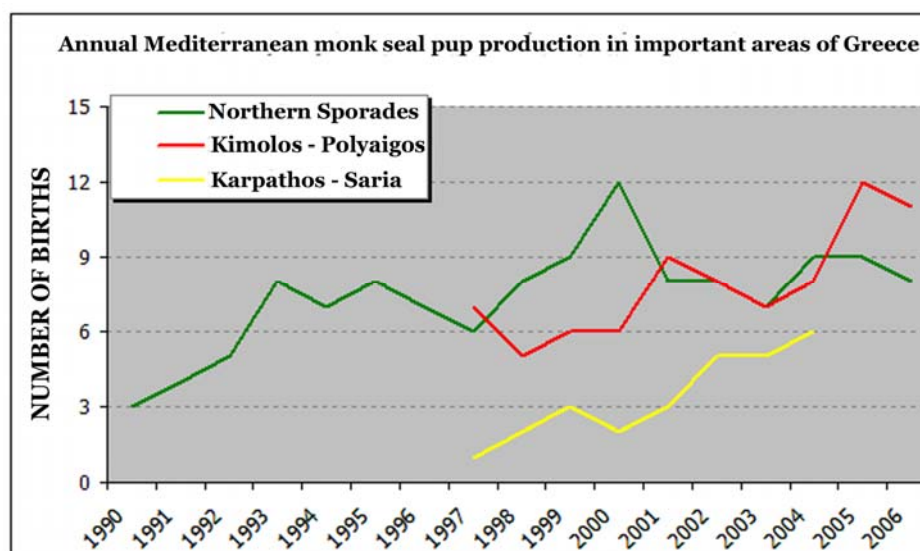


Fig. 2 - Monk seal pup production trends recorded in three locations in Greece (courtesy of MOM).

It must be noted that Androukaki et al. (2006) reported on average about 10 deaths per year, recorded over a 20 year period (1986-2005). With a minimum mean yearly pup production of >34, considering that significant emigration out of Greece is unlikely, either seal numbers in Greece are increasing, or >24 deaths on average manage to go unnoticed every year.

3.4. Threats. The Mediterranean monk seal is one of the world's most endangered mammal species (Anon. 1996), and the world's most endangered pinniped (Aguilar and Lowry 2008). It is

listed as Critically Endangered in IUCN Red List, based on criteria A2abc⁵, C2a(i)⁶, and E⁷ (Aguilar and Lowry 2008). The species' main threats include (Androukaki et al. 2006, Johnson et al. 2006, Aguilar and Lowry 2008):

- mortality caused by deliberate killing (likely exacerbated by overfishing-caused fish depletion);
- mortality caused by accidental entanglement in fishing gear;
- habitat loss caused by alteration of coastal ecosystems and disturbance caused by increasing human activities (i.e. tourism, fishing, use of dynamite, military exercises, human encroachment in coastal areas, and possibly climate change);
- prey depletion caused by overfishing;
- pollution.

Based on information received and samples collected from animals found dead in Greece over the past 20 years, most of the recorded deaths can be attributed to various natural causes⁸. Overall, the main causes of death were found to be non-human induced mortality (40%) and deliberate killings (18%); accidental deaths accounted for only 6% of all cases, whereas in a considerable number of cases (36%) the cause of death could not be determined, either due to inconclusive evidence or to the decomposition of the carcass (Androukaki et al. 2006). Accidental entanglements in fishing gear (mostly static gear commonly used in coastal fisheries) are a problem in most of the species' range, but affect largely the less experienced young seals (46% of juveniles vs. 17% of adults found drowned in fishing gear: Androukaki et al. 2006). The reduction of fish stocks in Greek seas seems to have intensified this problem, as fishing effort throughout the country increases and monk seals keep on looking out for fishing gear to "steal" a meal (Johnson and Karamanlidis 2000, Karamanlidis et al. 2008).

The available data indicated no detectable trends in monk seal mortality causes in Greece during the past two decades (Androukaki et al. 2006). Similarly, fishery-related mortality reported in a recent work by Karamanlidis et al. (2008) does not show any detectable trend between 1991 and 2007. Changes in small-scale artisanal fishing pressure in the Greek coastal zone due to socio-economic changes (e.g., shift from fisheries- to tourism-oriented professions in small island communities, decreasing economic revenues from fishing due to stocks depletion) have not generated visible signals in monk seal presence in the affected areas, although these may become more detectable if phenomena continue.

As argued by Androukaki et al. (2006), fishery-related causes of death (deliberate killings and entanglements) remain at unsustainable frequencies, and may be considered as the main responsible for the species' lack of recovery. These must be taken into serious consideration in the species overall conservation strategy, and alternative approaches to mitigate the monk seal-fisheries conflict must be explored.

Finally, sea level rise as a consequence of global warming is a concern (Intergovernmental Panel on Climate Change 2007) because it may cause available space in breeding and resting marine caves to decrease.

⁵ Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on direct observation, an index of abundance appropriate to the taxon, and a decline in area of occupancy, extent of occurrence and/or habitat quality.

⁶ Small population size (<250 of adults) and decline, with number of mature individuals in many subpopulations <50.

⁷ Quantitative analysis indicating that probability of extinction in the wild is >50% in 3 generations (100 years max.).

⁸ However, a significant bias may be caused by the deliberate concealment of killed seals by some fishermen.

3.5. Presence and status of monk seals in neighbouring countries. In addition to Greece, only Turkey (Güçlüsoy et al. 2004, Gücü et al. 2004) and Cyprus (Dendrinou and Demetropoulos 1999; Gücü et al. 2006) still host breeding monk seals in portions of their Aegean and Mediterranean coastal zone. Although no population structure studies and comparisons were made over the general area, these seals, scattered and fragmented into small groups, are almost certainly belonging to a population continuum with the seals inhabiting Greek waters. Anecdotal evidence was presented that monk seals may also occasionally be found in southern Albania, possibly stragglers from the Greek Ionian islands further to the south (White et al. 2005). Another potential Eastern Mediterranean location hosting monk seals which may be belonging to the same population(s) found in Greece is eastern Cyrenaica (Libya), where surveys among local fishermen have been recently conducted (Hamza et al. 2003). However, conclusive evidence of the actual continued existence of monk seals in Libya has not been found yet.

This brief description of monk seal presence and status in countries neighbouring on Greece strongly emphasizes the relevance of two elements of a comprehensive monk seal conservation strategy: a) the importance of conserving the species in Hellenic national waters, Greece being clearly today the epicentre of *M. monachus*' survival in the Mediterranean, and b) cooperation amongst Greece, Turkey and Cyprus should be considered an essential requisite of conservation action, should genetic analyses confirm the likely hypothesis that the monk seals in the area belong to a single population unit.

3.6. Institutions and organisations involved in monk seal conservation in Greece

Institutions and organisations involved in monk seal conservation in Greece are listed in Table 4.

Table 4 - Institutions and organisations concerned with monk seal conservation in Greece.⁹

Name of organisation	Type	Contact information	Role, involvement, relevance
Hellenic Ministry of Environment, Physical Planning and Public Works	GO	Amaliados 17 GR-11523 Athens, Greece Tel.: +30.213.151 5651 Fax: +30.213.151 5653 E-mail: tdfp@minenv.gr URL: http://www.minenv.gr	National competent authority responsible for the conservation of nature (including endangered species)
Hellenic Ministry of Rural Development and Food	GO	Chalkokondili 31 GR-10432 Athens, Greece Tel. +30.212-4616 Fax: +30212 4595 E-mail: genddason@yahoo.gr URL: http://www.minagric.gr	National competent authority responsible for the issue of research and rehabilitation permits for endangered species
Archipelagos - Environment and Development	NGO	Strofiliou 26, GR 14561 Kifissia Tel.: +30 210 807 4716 Fax: +30 210 807 4716 E-mail: archipelagos@tellas.gr	Environmental organisation involved in research and conservation of monk seal populations in the Ionian Sea since 1985
MOm - Hellenic Society for the Study	NGO	18, Solomou Street, GR-106 82 Athens, Greece	Environmental organisation active in monk seal research,

⁹ Organisations were listed in Table 4 on the basis of published documentation and reports which were made available during the preparation of this document. Eventual information on other organisations having a role in monk seal conservation in Greece will be added in a subsequent revision of the Strategy.

and Protection of the Monk Seal		Tel.: +30 210 522 2888 Fax: +30 210 522 2450 E-mail: info@mom.gr URL: http://www.mom.gr/	treatment and rehabilitation and conservation of populations and habitats throughout the country
World Wide Fund for Nature - Hellas	NGO	4, Fillelinon Street, GR-106 82 Athens, Greece Tel.: +30 210 331 4893 Fax: +30 210 324 7578 E-mail: info@wwf.gr URL: http://www.wwf.gr/	Environmental organisation involved in research and conservation of monk seal populations in the Ionian Sea

Table 4 illustrates a peculiarity of monk seal conservation in Greece: activities and initiatives were solely undertaken by Non-Governmental Organisations (NGOs). Governmental Organisations (GOs) were simply involved as the bodies responsible for the issuing of permits and the legal adoption of conservation measures.

4. Relevant national and European legislative framework

4.1. National legislation. The Mediterranean monk seal is under strict legal protection in Greece. By ratifying international conventions and introducing over the years national legislation, the clear intent of the Greek Legislator was to protect not only the species itself, but its habitat as well. The following (listed in chronological order) legislation instruments are of particular relevance, direct and indirect, to Mediterranean monk seal conservation in Greece:

- Law 420/26/1970 (Fisheries Code), which governs fisheries activities and, through prohibiting illegal fishing activities, aims at conserving fish stocks.
- Law 743/77 for the protection of the marine environment.
- Presidential Decree 67/81/29-11-1980, conferring protected status to a number of threatened species including monk seals, and forbidding their capture or killing.
- Law 1335/14-3-1983, ratifying the Bern Convention.
- Law 1337/14-3-1983, setting out special regulations for the protection of the nation's coastal zone.
- Laws 855/78 and 1634/18-7-1986, ratifying the Barcelona Convention and all its Protocols.
- Law 1650/16-10-1986, the framework legislation setting out the overall institutional and legal structure for the protection of the environment in Greece.
- Presidential Decree 519/16-5-1992, establishing the National Marine Park of Alonissos-Northern Sporades (NMPANS), explicitly to protect the largest breeding monk seal population in the Mediterranean; the subsequent Joint Ministerial Decision 621/19-6-2003 amended the zoning system of NMPANS and introduced specific zone-based conservation measures.
- Law 2055/30-6-1992, ratifying CITES.
- Law 2204/15-4-1994, ratifying the Convention on Biological Diversity (CBD).
- Presidential Decree 100/27-2-1995 sets monk seal habitats at the NW part of the coasts of Samos island under strict protection.
- Joint Ministerial Decision 33318/3028/98, ratifying the 92/43 European Council Habitats Directive.
- Law 2742/1999 regulating all aspects related to the establishment of management bodies for protected areas and/or endangered species.
- Law 2719/1999, ratifying the Convention on Migratory Species (CMS).

- Ministerial Decision 336107/25-2-2000, establishing specific criteria, protocols and procedures for the establishment and operation of wildlife treatment and rehabilitation facilities.
- Joint Ministerial Decision 197/27-8-2002, establishing a management body responsible for the management of the NMPANS.
- Joint Ministerial Decision 197/27-8-2002, establishing a management body responsible for the management of the Karpathos-Saria area.
- Joint Ministerial Decision 49567/22-12-2006, establishing a protected area, including a zoning system, and introducing specific zone-based conservation measures in Milos island in the Cyclades.

4.2. European legislation. Two important items of European Community law are quite relevant to monk seal conservation in Greece: Council Directive 92/43/EEC of 21 May 1992, on the conservation of natural habitats of wild fauna and flora (also known as the "Habitats Directive"), and Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 (a.k.a. the "Marine Strategy Framework Directive").

The **Habitats Directive** (1992), the cornerstone of Europe's nature conservation policy, has major relevance to Mediterranean monk seal conservation. The directive's overarching goal strives to ensure the "preservation, protection and improvement of the quality of the environment, including the conservation of natural habitats and wild fauna and flora" – an essential objective of general interest pursued by the Community, as stated in Article 130r of the Treaty of Rome. The Mediterranean monk seal is listed in two of the directive's Annexes: II and IV. In Annex II the monk seal is designated as a species of Community interest whose conservation requires the creation of Special Areas of Conservation (SAC); furthermore, the monk seal is singled out in Annex II as a priority species, i.e., an endangered species for the conservation of which the Community has particular responsibility in view of the proportion of its natural range which falls within European territory. Member States are mandated to take the requisite measures to establish a system of strict protection for the animal species listed in Annex IV, and must establish a system to monitor the incidental capture and killing of such species. The Directive mandates Member States to designate SACs to protect species listed in Annex II, which should then be linked together to create a coherent European ecological network named *Natura 2000*. SACs are designated on the basis of a list of Sites of Community Importance (SCI) selected because they contribute significantly, amongst other things, to the maintenance or restoration at a favourable conservation status of a species in Annex II. Once a SCI has been adopted, it must be designated as a SAC by the concerned Member State as soon as possible and within six years at most. The Habitats Directive was ratified by Greece in 1998 and has thus become national law.

The recent **Marine Strategy Framework Directive** (2008) addresses the problem deriving from pressures exerted on natural marine resources and demand for marine ecological services, admittedly often too high in Europe, and the urgent need to reduce the Community impact on marine waters. To do so, the Directive establishes a framework within which Member States shall take the necessary measures to achieve or maintain good environmental status¹⁰ in the marine environment by the year 2020 at the latest. For that purpose, marine strategies shall be developed and implemented, amongst other things, in order to protect and preserve the marine environment. In particular, the Directive recognises the relevance to the achievement of good environmental

¹⁰ Art. 3(5): " 'good environmental status' means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations, i.e.: (a) ... **Marine species and habitats are protected, human-induced decline of biodiversity is prevented and diverse biological components function in balance;** ... ".

status of the establishment of MPAs, including areas already designated or to be designated, amongst others, under the Habitats Directive, and under international or regional agreements to which the European Community of Member States are Parties. The Directive mandates each Member State to develop a marine strategy for its marine waters, culminating in the execution of programmes of measures designed to achieve or maintain good environmental status. The Directive sets out a process by which Member States develop their own marine strategies, including preparatory work, the establishment of environmental targets, the enactment of monitoring programmes, and the implementation of a programme of measures, including coherent and representative networks of MPAs, that must adequately cover the diversity of the constituent ecosystems. In particular, the Directive specifies that the obligation for Member States to designate *Natura 2000* sites will make an important contribution to the process.

The Marine Strategy Framework Directive was designed to create a synergy with the Habitats Directive for marine protection. The 1992 Directive had established a solid groundwork for species and habitat protection, whereas the 2008 Directive provides a framework requiring Member States to adopt their own marine conservation strategy, which includes the provisions for species and habitat protection contained in the 1992 Directive. Most importantly, the 2008 Directive also introduces a plan of action including a binding time framework for Member States to comply: assessment of current environmental status and establishment of environmental targets by 15 July 2012; establishment and implementation of a monitoring programme by 15 July 2014; development by 2015 of a programme of measures designed to achieve good environmental status, which must come into operation by 2016 at the latest.

4.3. Critical analysis. There is no shortage of legal provisions, both at the national and European levels, to support monk seal conservation and recovery in Greece (Moisiadou and Karamanlidis 2003). It can be assumed that if correctly implemented and effectively enforced, the existing legislation would afford the species and its habitat a level of protection sufficient for its population(s) to recover. However, in spite of this wealth of legislative instruments and actions, monk seals recovery in Greece during the past decades is far from evident.

Admittedly, Greece has remained the main stronghold of the vanishing Mediterranean monk seal in part owing to the geomorphology of its coastline, fragmented into countless small uninhabited islands which constitute a refuge for the species, but also in part because monk seal conservation action – legal action by the State and concrete initiatives by NGOs – has taken place there. Other major portions of the species' range – most notably the whole of the Western Mediterranean – did not benefit from such combination of factors; for this reason, and in spite of the Habitats Directive coming into force, monk seals were all but extirpated from Western Mediterranean Member States. As a consequence, Greece is now the European State hosting by far the greatest proportion of the species' remaining breeding population(s). Therefore, the strongest efforts to halt the decline of monk seals are justifiable on all accounts: the definitive loss of a Community priority species would be a tremendous blow to the credibility not of only of Greece's, but also of Europe's conservation effort and effectiveness.

The problem lies mostly with the implementation of the legal provisions and in their compliance. Illegal fishing (comprising the use of explosives) and overfishing routinely occur in Greece throughout the species' range, including in areas containing monk seal critical habitat. Individual monk seals continue to be killed, and yet perpetrators have rarely been identified and prosecuted. Human encroachment in the nation's coastal zone continues unabated, including in portions of the seals' critical habitat. Areas that are well-known today as breeding sites for the species still lack any type of special protection; other similarly important sites are protected only on paper, without any effective

enforcement conducted. Finally, the systematic monitoring of incidental captures and killings of monk seals, mandatory for all European Member States under the provisions of the Habitat Directive¹¹, is left to the initiative of NGOs¹² rather than being resourced and/or carried out by the competent institutions.

Concerning the *Natura 2000* network, several SCIs has been adopted which contain monk seal habitat. However, given the widespread distribution of the species across the nation's coastal zone, it is very difficult for any coastal SCI in Greece not to contain monk seal habitat. Some of the SCIs proposed, e.g., Fourni, Kimolos, and Karpathos in the Aegean Sea (Adamantopoulou et al. 2000), are indeed important for monk seal conservation in Greece. By contrast, many locations that are known for their special conservation importance for the species are not included in the SCI list. Finally, no SCI listing has led yet to the creation of SACs, even though the deadline of six years was conspicuously missed. The Marine Strategy Framework Directive now provides Greece with an important opportunity for making up for the lost time through the development and implementation of its own national marine strategy. In that process monk seals should become a centrepiece of the strategy both by virtue of their intrinsic value as elements of Mediterranean biodiversity, and because of their importance in support to the conservation of the nation's coastal zone as umbrella and flagship species.

Citizens may find it rather frustrating that so little was accomplished in terms of enforcement of legislation relevant to the conservation of monk seal in Greece, in spite of the considerable body of specific international, European and national provisions; and some may consider taking legal action to challenge the Greek State for its widespread failure in living up to its commitments and enforcing its own rule of law. That is certainly an option available to democratic societies. Unfortunately, however, such initiatives are highly costly and time-consuming, and probably of limited immediate effectiveness (Moisiadou and Karamanlidis 2003). By contrast, a combination of direct conservation actions (including law enforcement) with education and awareness campaigns seems like a more promising avenue for success. This may be of particular relevance to the small human communities, often located in remote insular locations, that are most concerned by interactions with monk seals, and that often are left alone to bear the economic burden of coexisting with monk seals (i.e., damages to fishing gear and to the catch caused by the seals). In those communities the tight-knit social texture may make it extremely difficult, if not impossible, to enforce the law against illegal actions considered "minor" on the local ethical scale, such as fishery and environmental violations, and even the use of explosives and the killing of a monk seal. The conquest of local stakeholders to the imperative of conserving the marine environment and the monk seals, be it under the impetus of aesthetic, cultural or environmental values, or in expectation of future economic gain (e.g., through ecotourism), seems like the most promising companion to a greater observance of the law.

¹¹ Art. 11: "Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species".

¹² The "RINT" programme was started by MOM in 1991 at the time of the dolphin morbillivirus outbreak.

5. Relevance and effectiveness of the international conservation framework

5.1. International agreements. Mediterranean monk seal conservation is very high on the agenda of a large number of international environmental agreements. These include, most notably:

- The Mediterranean Action Plan of the United Nations Environment Programme (UNEP MAP), with headquarters based in Athens and acting as the Secretariat of the Barcelona Convention ("Convention for the protection of the marine environment and the coastal region of the Mediterranean", Barcelona, 1976 and 1995). The Barcelona Convention is complemented by a number of specific Protocols, including the "Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean", which has relevance to the protection of monk seals. A Regional Activity Centre for Specially Protected Areas (RAC/SPA) was established in Tunis with the mandate of supporting Parties to the Convention in the implementation of the Protocol's provisions. In particular, the Contracting Parties to the Barcelona Convention adopted in 1987 an "Action Plan for the management of the Mediterranean monk seal (*Monachus monachus*)", urging Parties, amongst other things, to reduce adult mortality, to establish a network of marine reserves, and to encourage research, data collection, rehabilitation, and information programmes for fishing communities and various other stakeholders.
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as CITES or Washington Convention (Washington, 1973), strictly forbidding trade in endangered species, such as the Mediterranean monk seal, listed in its Appendix I.
- The Convention on the Conservation of Migratory Species of Wild Animals, also known as CMS or Bonn Convention (Bonn, 1979). The Mediterranean monk seal is listed in the Convention's Appendix I (strictly protected migratory species that have been categorized as being in danger of extinction throughout all or a significant proportion of their range).
- The Convention on the Conservation of European Wildlife and Natural Habitats, also known as Bern Convention (Bern, 1979), placing the Mediterranean monk seal under strict protection from intentional killing and disturbance, and requiring the establishment of special conservation areas.
- The Convention on Biological Diversity, also known as CBD (Rio de Janeiro, 1992), although not explicitly referring to the Mediterranean monk seal, urges Contracting Parties to develop national programmes that will safeguard their natural heritage and biological diversity.
- The United Nations Convention on the Law of the Sea, also known as UNCLOS (Montego Bay, 1982), has special provisions for marine mammals (Art. 65: "States shall cooperate with a view to the conservation of marine mammals ...").

5.2. International Union for the Conservation of Nature (IUCN). IUCN deserves to be mentioned separately owing to the relevance of this international NGO as a provider of specialised expertise in matters relating to the conservation of natural habitats and species. IUCN's actions are relevant to monk seal conservation in several ways.

First, IUCN maintains the authoritative Red List of Threatened Species, where *M. monachus* is listed as Critically Endangered (see Section 3.4). In the Red List species of animals and plants are entered based on assessments of their threat status, using standardised criteria allowing placing the conservation status of taxa in a global perspective. Based on the Red List the Mediterranean monk seal has gained world-wide recognition as one of the world's most endangered mammals.

Second, IUCN has developed a number of guidelines and policy and position statements that are relevant (or may become relevant in the future) to monk seal conservation in Greece. These include:

- policy statement on research involving species at risk of extinction;
- guidelines for re-introductions;
- policy statement on captive breeding;
- position statement on translocation of living organisms;
- policy statement on state gifts of animals.

Third, IUCN is active in the Mediterranean Sea under various capacities and activities (e.g., the Centre for Mediterranean Cooperation in Malaga, the Regional Coordination for the Mediterranean and Black Seas of the World Commission on Protected Areas – Marine, also known as WCPA), providing expert and technical support to a wide spectrum of conservation activities, including the establishment of MPAs.

5.3. Critical analysis. Based on the very large number of international agreements and conventions that Greece has adhered to, which explicitly require endeavouring to protect and strive to recover Mediterranean monk seals and their habitat, undoubtedly Greece is formally fully committed to monk seal protection on the international scene. Such condition, however, clashes resoundingly with the disappointing lack of factual commitment by the Greek State, in terms of direct, practical and effective initiatives, that comes in direct contrast with the achievements of the work of NGOs working for the conservation of the species.

During the past four decades many workshops and meetings have brought together scientist and managers to discuss monk seal conservation actions (summarised in Israels 1992), however no significant results were achieved in terms of halting the overall decline of the species. Conservation initiatives are largely limited to declarations on paper, and consequently most of the small subpopulations that survived three decades ago, when conservation of the species was already identified as being a priority, are now extinct (Aguilar and Lowry 2008).

This situation is quite indicative of the inherent weakness of the international environmental legal system. A nation's commitment in such fora is not perceived as mandatory. Accountability is strictly of a moral nature, and thus easy to brush off. The only available tools to induce action remain diplomatic pressure and lobbying by concerned stakeholders (Moisiadou and Karamanlidis 2003). As a consequence, international leverage can only be subsidiary to a nation's own conservation undertaking and commitment, and the most relevant effort can only come from within.

A case in point is the decades-long effort enacted within the framework of the Barcelona Convention – a regional agreement designed specifically to conserve the Mediterranean natural environment – to stave off the monk seals' demise. Twenty-two years after the adoption of a specific Action Plan (see UNEP MAP RAC/SPA 2003), instead of recovering *M. monachus* has moved closer to its extinction in the Mediterranean. The Contracting Parties to the Convention, highly concerned about this situation, at their 14th Meeting in 2005 in Portoroz, Slovenia, adopted a declaration - the "Portoroz Declaration" - with a set of recommendations (UNEP 2005), urging countries to take inspiration from existing examples of good practice (such as Alonnisos in Greece and Foça in Turkey) to: (a) stop the killing of monk seals through awareness-raising among fishermen and local authorities, and create favourable conditions within their communities to remove reasons for killing the animals; and (b) create marine protected areas in monk seal critical habitat. It was also recalled that 2010 was a target year with respect to reducing the degradation of biodiversity worldwide. It was suggested that the monk seal could become the symbol of cooperation for achieving this goal. The success or failure of efforts to save the species will be a defining moment for the future of UNEP's Mediterranean Action Plan. Unfortunately diplomatic etiquette prevented explicitly addressing such recommendations to those Mediterranean countries where monk seal breeding

colonies still exist, such as, most notably, Greece. Worse even, no special action was undertaken ever since by any of the concerned countries – and by Greece in particular – to pay heed to the recommendations stemming from the Portoroz Declaration. Most importantly, the very few and tentatively successful stories of monk seal conservation in the Mediterranean, such as those cited in Alonnisos and Foça, are very much due to the efforts of NGOs working closely with the local communities, obtained through dedication and motivation in spite of institutional bureaucracy and lack interest (Triantafillou 2006).

Concerning IUCN, regrettably the organisation's Species Survival Commission (SSC, with the Pinniped Specialist Group) has been noticeably inactive during the past decade with respect to the conservation of what was by itself defined the most endangered pinniped species of the planet. It would thus seem desirable, and conducive to greater scientific focus, that the SSC will revitalise its interest towards Mediterranean monk seal conservation in the future, in particular capitalising on the considerable growth of knowledge and conservation expertise that has developed in the Eastern Mediterranean in recent years.

PART TWO

EVALUATION OF THE "1996 STRATEGY"

The "1996 Strategy"

In 1996, "recognising the need of a formal long-term national strategy binding both national and EU authorities", two Greek NGOs particularly concerned for the survival of monk seals in their country, i.e., *Archipelagos – Marine and Coastal Management*, and *MOM – Hellenic Society for the Study and Protection of the Mediterranean Monk Seal*, jointly published a document containing an operational framework to serve as a basis for the development of such strategy (Anon. 1996), inspired in part by previous work (e.g., Panou et al. 1993)..

The document stressed the importance of Greece for the survival of the species, noting that at the time the country hosted "the largest monk seal population in the European Union" and "about half of the remaining total world population"; today, this proportion has shifted to about two thirds, caused not by an increase in Greece but rather by a decline elsewhere, thus adding further weight to the responsibility saddled on Greece with Mediterranean monk seal conservation at the global scale. The 1996 Strategy also identified the two principal threats to monk seal survival, to be urgently addressed (direct mortality primarily caused by fishermen, and habitat loss), and recommended two types of parallel actions: an immediate reduction of human-caused mortality, and a longer-term protection of habitat.

The "1996 Strategy" further identified ten categories of means and "tools" available for monk seal conservation in Greece:

1. the establishment and effective management of "special conservation areas" (following the EU Habitats Directive terminology),
2. the reduction of human-caused mortality related to fisheries;
3. the information to and education of the public;
4. the research on the biology and ecology of the Mediterranean monk seal;
5. the rescue and rehabilitation of sick, wounded or orphan animals;
6. the reduction of pollution;
7. the reduction of overfishing;
8. the improvement and enforcement of existing legislation;
9. breeding in captivity;
10. translocation.

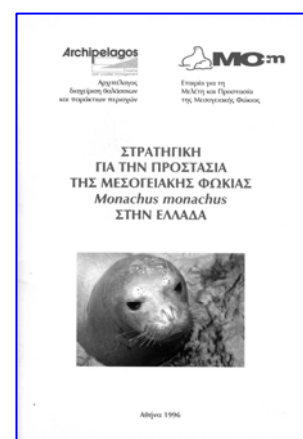


Photo 1. The "1996 Strategy"

In an effort to evaluate the implementation of the 1996 Strategy, the following sections summarise the work conducted in each of the categories listed above, and presents the key accomplishments, shortcomings and lessons learned during the last decade.

1. Establishment and management of "special conservation areas"

On this topic, the "1996 Strategy" stated:

"It has been shown that in order to increase the probability of survival of the species, as many local seal populations as possible should be protected. In order to achieve this goal, a network of special conservation areas with strategic distribution throughout Greece must be established the soonest possible, so as to ensure the conservation of important local populations. Such distribution will, at the same time, ensure the survival of local populations in cases of epizootics or

other catastrophes. The necessity for immediate implementation of this measure is reinforced even further by the fact that long-term and apparent results are expected gradually.

"The special conservation areas must be chosen with strict criteria based on international guidelines and on existing international standards. The selection criteria for the areas of the network should be based on the importance of each local seal population, the geographic distribution of the areas within the country, the ability of exchange between the local seal populations (migration corridors), and the degree of human activity in each area. The special conservation areas must function effectively as soon as possible ensuring beforehand, or at least in parallel with the other actions, the acceptance by the local public of the necessary regulations to come; a basic and most important prerequisite for the success of this measure. A long-term and integrated planning, aiming at the sustainable development, including the human factor, and taking into account all relevant socio-economic factors, is imperative for these sensitive areas.

"A necessary precondition for the establishment of the above network is the existence of effective management in the two areas of well known importance and in which long-term and co-ordinated conservation efforts have been carried out with positive results, namely the Northern Sporades and the Ionian, so as to ensure optimum protection. Moreover, these two areas will serve as 'demonstration models' for the establishment of future conservation areas of the network, since without successful 'models' similar regulations will hardly be accepted elsewhere. In addition, the experience gained from these areas will facilitate and accelerate the procedures for establishing and managing of future network areas, which should start in parallel the soonest possible."

Everything that was written on this subject in 1996 still remains valid after 13 years. An interconnected network of specially protected areas for monk seals, where the animals are given the chance of breeding undisturbed and recovering, still seems like an obvious and most urgent conservation measure. What has changed since 1996 are the criteria for selection of such areas, which can now be dictated by knowledge of the few remaining locations where breeding groups occur, rather than being solely based on international guidelines and standards, as stated in the 1996 Strategy.

What follows is an account of progress concerning site-based monk seal protection in Greece during 1996-2008.

Proposals of new areas: A number of sites important for monk seals were identified and proposed for protection by concerned NGOs - such as Archipelagos - Marine and Coastal management, MOM, and WWF Greece - in the Ionian Sea, Northern Sporades, Cyclades and Dodecanese. In 1996 a *Special Environmental Study*¹³ (SES) was prepared by MOM in collaboration with the Hellenic Ornithological Society for the coast of Pelion and the islands of Skiathos and Skopelos in the Northern Sporades, including specific conservation provisions for monk seal habitat. In 1999 the proposal of the establishment of nature conservation areas in four island complexes harbouring important monk seal habitat - Zakynthos in the Ionian Sea, Milos-Kimolos in the Cyclades, Karpathos-Kasos in the Dodecanese, and Samos-Fourni-Ikaria in the Eastern Aegean Sea – followed by the preparation of SESs for Kimolos, Karpathos and Zakynthos, was formulated as a result of a 3-year LIFE project, "The Mediterranean Monk Seal in Greece: Conservation in Action", funded by the European Commission to MOM in collaboration with WWF-Greece. In 2002 coastal and marine areas of the islands of Kefalonia and Ithaca, containing important monk seal habitat in the Ionian Sea, were formally included in the *Natura 2000* network based on proposals and information submitted to the Ministry of environment by Archipelagos - Marine and Coastal Management. In 2007 an update on Gyaros Island in the Cyclades was submitted to the Ministry of the environment by MOM, with a proposal to formally include the area in the *Natura 2000* network; the proposal was based on three

¹³ A legal prerequisite for the formal establishment of a protected area in Greece.

years (2004-2006) of data on a breeding monk seal group found on the island, obtained initially through RINT (Rescue and Information Network), and subsequently with *in situ* surveys.

Designation of new areas: The Ministry of the environment decided not to proceed with designating protected areas on the coast of Pelion and on the islands of Skiathos and Skopelos, as proposed in 1996 by MOM and the Hellenic Ornithological Society. Similarly, in 2000 the Ministry – under negative pressure caused by a highly conflictive situation which had developed around the National Marine Park of Zakynthos for the conservation of loggerhead turtles – turned down the establishment of a protected area in the northwest coasts of Zakynthos, as proposed in the SES, despite a positive attitude of the local communities living in the northern part of the island. Finally, in 2003 in spite of four years of active lobbying by NGOs led by MOM, and of the fact that the area had been included in 1999 within the *Natura 2000* network, the Ministry decided not to include Kimolos amongst the 27 top priority areas selected for protection, bowing to pressure from a small but influential local group. On a more positive note, following a four-year lobbying campaign by MOM together with the local and regional authorities, in 2003 the Ministry of the environment included the Karpathos area as well as the National Marine Park of Alonissos among a national list of 27 top priority areas selected for protection. It should be noted, however, that up until today the Greek State has still not issued the appropriate legislation for the designation of Karpathos as a Protected Area. Finally, in 2006 the Ministry established a protected coastal and marine area on the island of Milos, including measures to protect monk seal habitat, on the basis of a SES prepared by a number of organisations, including MOM. By contrast, a small protected area on the coast of Samos, established in 1995 with the main goal of protecting the local monk seal population and habitat, was surveyed in 1996 by MOM, who found the area degraded and without evidence of a resident monk seal breeding population.

Management and conservation actions: During the 1996-2007 period management activities were carried out mostly in the National Marine Park of Alonissos - Northern Sporades (NMPANS), so far the only MPA in Greece which was formally established (in 1992) specifically to protect monk seals. After the submission of a detailed SES, approved by the Ministry of the Environment in 2002, the zoning system and the conservation measures for the Park were revised in 2003 through a Joint Ministerial Decision, which adopted most of the proposals contained in the SES. In the same year a 10-member Management Body was formally established, including national and local authorities and stakeholders' representatives as well as a representation from MOM. However, the Management Body remained essentially inactive due to lack of funding until its Board was renewed and reappointed in 2006. Management instability during the years following the establishment of the Management Body negatively affected the implementation of crucial management and conservation activities in the Park. An indicative example is the guarding of the Park; between 1993 and 2003 guarding of the Alonissos MPA was conducted by MOM, initially with support from the European Commission, and later thanks to a number of national and international funding sources. Despite some initial mistrust by the local population, the guarding programme, a first for its kind in the country, bore concrete results such as a significant reduction in illegal activities within the Park area. However, after the new Management Body took office, from 2003 to 2007 the NMPANS benefited from no guarding. Even when guarding was resumed in 2007, the Management Body, not taking into account the past experience, encountered several problems in its implementation, including strong opposition by the local community. Monk seal population monitoring in the Park followed a similar trend: carried out regularly by MOM with partial support from the European Commission from 1991 to 2006, since 2007 monitoring was taken in charge by the new Management Body; however, neither methods nor results have been made public since that change. Environmental awareness and education activities targeting local inhabitants and tourists have been carried out by MOM during summer from 1990 to present, through an information centre in Alonissos and information booths in Skiathos and Skopelos, and through various education programmes targeting local students. Finally,

a state-owned research station in Gerakas (Alonissos), created in the late 1980s to be the headquarters of NMPANS, was manned by MOM and enriched with environmental exhibits, a library and seminar facilities from 1998 to 2001, with support from the Ministry of the Environment, the Prefecture of Magnesia and the EU. However, since 2001 the facility has remained closed due to lack of financial support by the Ministry.

Another relevant series of conservation initiatives was stimulated by a four-year LIFE project funded by the European Commission to MOM, "*The Monk Seal: Conservation actions in two Greek NATURA 2000 sites*". Started in 2001, the project designed and implemented *in situ* conservation and management activities in two important monk seal areas – Kimolos and Karpathos - in preparation of the formal establishment of protected areas in those locations. Activities included the establishment of regular monk seal monitoring programmes, endowment with patrol boats, preparation of guarding guidelines and protocols, the establishment of information centres and the implementation of awareness campaigns targeting the local communities and the visitors of both areas. This programme eventually led to the formal establishment in 2002 of a management body for the Karpathos – Saria area, which however remained essentially inactive due to lack of institutional funding until 2007.

Conclusions: Formal legal establishment of marine protected areas is a difficult, expensive and time-consuming effort which requires, amongst other key issues, conquering the local human communities to the cause. An important milestone in the process of establishing MPAs with relevance to the monk seal in Greece was the establishment in 1992 of a national marine park in the Northern Sporades, the NMPANS, and the first of its kind in the country. This process was intensified during the 1996 – 2007 period with the effort of establishing MPAs in the Milos - Kimolos and Karpathos -Saria complexes and in Zakynthos island, however most of the work is still ahead. An overview of place-based protection of monk seals in Greece (Table 5) reveals that most important monk seal areas have remained and still are without any legal and effective form of protection; even the few (2) areas that are legally established do not fully benefit from effective protection; in conclusion, there still isn't a single area in Greece where monk seals are effectively protected.

Name of area	Legal protection	Effective protection
Alonissos and Northern Sporades	yes	partial
Kimolos - Polyaigos	no	no
Karpathos - Saria	no	partial
Zakynthos – Kefalonia – Ithaca	no	no
Milos	yes	no
Gyaros	no	no
Samos	yes	no

Table 5 – Protection status of the areas containing remaining important monk seal habitat in Greece (MOM, pers. comm.)

Furthermore, the few existing protected areas are not linked in a functional network, but are planned and operate independently. Most of the achievements in protecting marine areas were obtained through NGO activism, with strong support from the European Commission; in stark contrast, national institutional support to the establishment of MPAs in monk seal habitat was mixed at best, and obstructive in several instances. Local awareness in many of these important areas is still immature, which causes local communities to remain hostile to marine conservation, and specifically to monk seal protection (Trivourea 2003). Management in the established areas is also quite unsatisfactory. Astonishingly, NMPANS was left without a guarding system for four full years (between 2003 and 2007), which essentially meant that in that period the world's iconic

Mediterranean monk seal protected area was only a paper park; still today the NMPANS management process appears opaque and inconsistent with past practices. Finally, lack of consistency in institutional funding revealed to be a crippling factor in many occasions, resulting in the damaging interruption of processes and vital functions, and in a waste of valuable resources¹⁴.

2. Reduction of human-caused mortality related to fisheries

On this issue, the "1996 Strategy" stated:

"The deliberate killing of seals, mainly by fishermen due to damages to fishing gear caused by the animals, is the main reason for the decline of populations throughout Greece and must be faced immediately and independently of the previous measure. The establishment of special conservation areas by itself does not ensure the survival of the species: firstly, animals may move out of these safe zones, and, secondly, the survival of the remaining seal populations and of individuals moving outside conservation areas is not ensured, since such a network can not cover sufficient geographic space throughout the country.

"For the above reasons, the policy capable to ensure the survival of the remaining seal populations must be based on a mechanism covering the country in a uniform and satisfiable manner, thus on the sector mainly involved in deliberate killings and at the same time covering the entire Greek marine area, namely fisheries. Taking into account that conservation efforts may involve socio-economic changes in the coastal communities, it is necessary to substantially involve the local public (fishermen, local organisations, authorities, etc.) in the conservation activities and to establish mutual trust and co-operation.

"The accidental death of seals in fishing gear is an additional factor related to population decline in which fisheries are involved. This factor cannot be adequately assessed with the scarce existing data. Moreover it is difficult to quantify due to intrinsic reasons: since the killing of a seal is illegal, such incidents will remain unknown at least as long as fishermen are not actively involved in conservation efforts. Further research and data collection would provide the necessary background for the development of adequate policies to avoid fishing methods most likely to cause accidental deaths of seals. If accidental deaths prove to be an important mortality factor (in particular considering the increasing use of fishing gear), the strategy for the conservation of monk seals will possibly have to be partly revised.

"It should be noted here that during the last decade, very little attention has been given to the seal-fisheries interaction, a crucial factor in the conservation of the species. The reduction of killings is the only protection measure that can have positive results in the short term."

¹⁴ On 19 June 2008 MEP Margaritis Schinas requested a Commission response to the following question: "In view of the direct link between the sustainability of marine ecosystems and the abundance of marine species, will the Commission say what measures it has taken, and what measures it will take in the future, to protect the Mediterranean monk seal vigorously and effectively?". Replying on behalf of the Commission, Environment Commissioner Stavros Dimas underlined a range of international and community-wide legislation aimed at protecting endangered species, including the Mediterranean monk seal: "In Greece, the efforts to conserve the monk seal have led to the establishment of a strictly protected National Marine Park, 72 Special Areas of Conservation (SACs), a National Action Plan and the establishment of management bodies for two of the monk seal's most frequented areas." In reality, the NMPANS remains in management crisis, with little public support and frequent violations of the monk seal core zone; of the 72 so-called Special Areas of Conservation referred to, virtually all are purely theoretical at present, with no practical protection or management measures in force; of the two Natura 2000 sites generally cited as potential monk seal reserves with proven breeding populations (Kimolos-Polyaigos in the Cyclades, N. Karpathos in the Eastern Aegean), only the latter possesses any management plan or infrastructure.

This action addressed the problem of fishery-related monk seal mortality, which essentially consists of two very different categories of events: intentional killings by fishermen and bycatch. During the 1996-2008 periods, a number of initiatives were carried out, and briefly described in the following paragraphs.

National Rescue and Information Network (RINT). RINT, first introduced at the national scale in 1991 in coincidence with the outbreak of dolphin morbillivirus epizootic, was operated by MOM throughout the 1996-2008 period, to (a) maintain a nation-wide monitoring of the status and distribution of the species, including reports from laypersons; (b) identify and evaluate the relative importance of the various causes of mortality, in particular those related to fisheries (i.e. deliberate killings and entanglements in fishing gear); and (c) provide an early warning system for mass mortality events or other catastrophes such as oil spills. This work resulted, amongst other things, in the monitoring over the years of the effects of the seal-fisheries interactions, and the detection of mortality patterns (e.g., Androukaki et al. 2006).

Recording seal-fishery interactions: In addition to RINT, a number of area-specific initiatives were conducted to evaluate the status and effect of the seal-fishery interaction in such areas. These include studies: (a) in the area of Zakynthos carried out in 1996 by WWF-Greece; (b) in the Ionian Sea conducted in 1998-1999 by Archipelagos-Marine and Coastal Management in collaboration with WWF-Greece (Pilot study «Technical economical investigation of the effects of the Mediterranean monk seal on coastal fisheries on the western coast of Zakynthos»); and (c) in the NMPANS in 2005 by MOM. Finally, in 2005 a four-year LIFE-Nature project, "MOFI", was initiated by MOM in collaboration with WWF Greece and the National Institute for Fisheries Research of Kavala. The project addresses a number of issues related to interactions between seals and fisheries at the national level, and will develop an action plan to mitigate the negative effects of this conflict for both seals and fisheries. The drafting of this document is included among the tasks performed within the framework of the "MOFI" project.

In 2008 a project envisaging the involvement of a network of fishermen in the protection of marine living resources was conducted in Kefalonia by Archipelagos– Environment and Development (formerly "Archipelagos - Marine and Coastal Management"). Activities involved, amongst other things, the reporting of monk seal sightings, supporting population estimates in the area.

With the exception of the "MOFI" project, all the activities concerning fisheries-related monk seal mortality carried out during the 1996-2008 period were centred on the collection of information on the extent, type, distribution and intensity of the problem, but contributed little to actively pursuing its solution. Today monk seals are still killed in Greece, both as a result of deliberate aggression by fishermen (e.g., Anon. 2008) and by drowning in fishing gear.

Lastly it should be noted that during this period, fish farm operators both in Greece and Turkey are increasingly coming into conflict with monk seals that are reported to raid their facilities, particularly where adequate protective netting is not installed (Güçlüsoy and Savas 2003a). In view of this, the "MOFI" Action Plan will include proposals to mitigate this interaction as well.

Conclusions: While the 1996 Strategy singled out two amongst the highest priorities in monk seal conservation – habitat conservation and reduction of fishery-caused mortality – only the first was vigorously addressed by NGOs due to limited available human and financial resources, most of which were invested in the protection of important populations and habitats. Interactions with fisheries were seen as a daunting issue and therefore the problem was somewhat left behind, until the 2005 "MOFI" project finally brought the issue on the forefront. However, it would be a mistake to consider addressing fisheries problems as an effort to ensuring monk seal conservation *sensu stricto*.

If it is correct to assume that most of the factors that are responsible for the decline of Mediterranean monk seals derive from human activities in this marine region that are unsustainable and/or illegal (e.g., overfishing, illegal fishing, illegal killing of seals, in addition to habitat degradation), then the fate of monk seals will depend in large part on Greece having the political will to take responsible and precautionary action to mitigate such known anthropogenic threats; the principal management measures that will benefit monk seals are already embedded in existing legislation and international commitments; finally, if all such measures - invoked by existing international, regional and national legal instruments for the management of the Mediterranean Sea - were to be fully implemented and enforced, the decline of monk seals would likely cease.

3. Information to and education of the public

Concerning this aspect, the "1996 Strategy" stated:

"Informing and educating the public must always be an integral part of any conservation activity at the local and the national, but also at the international level, in order to ensure the acceptance and collaboration of the public. Effective conservation will be realized only when the rationale and the implementation of necessary measures will become a part of the public's opinion."

Relevant initiatives conducted on information, awareness and education during the 1996-2008 period include a number of activities conducted by MOm, ranging from the development of a national media campaign to inform the general public on the endangered status of the monk seal and the need to conserve it, to the development of environmental education programmes for school children in Athens as well as in specific critical breeding habitats for the species (i.e. NMPANS and the neighbouring islands; Kimolos and the neighbouring island of Milos; Karpathos; Zakynthos and Kefalonia). In 2001 thematic environmental libraries for local children were established and updated in Alonnisos, Kimolos and Karpathos. In 2004 an educational package on marine environmental stewardship targeting the inhabitants of the Cyclades was created and distributed to all the schools of that archipelago. Finally, a major effort of awareness building and education on seal-fisheries interactions targeting the fishing communities in the NMPANS, Kimolos, Karpathos, Zakynthos, Chios-Psara, Kalymnos, and Kythira islands was started in 2005 within the framework of the "MOFI" LIFE-Nature project, and will continue until 2009 (further information on the above initiatives can be found among documents listed in Section 9).

Conclusions: All these activities are still very relevant and needed, and there are signs that public opinion may be changing in favour of monk seal conservation even at the local level. For instance, Langford et al. (1998) and Kaval et al. (2007) discovered during interviews of visitors and residents, respectively, of Lesbos and Zakynthos that "willingness to pay" (WTP) to protect the species was very widespread; the fact that Zakynthos residents declared to be willing to pay more than tourists was a pleasant surprise. However, the dismal weakness of monk seal conservation effort undertaken so far in the country by the authorities in charge of nature conservation, at all levels (e.g., Trivourea 2003), testifies that protecting the species in Greece has not been subsumed yet into the highest national environmental priority, as it should.

4. Research on the biology and ecology of the Mediterranean monk seal

On this issue, the "1996 Strategy" stated:

"Internationally, the knowledge of the biology and ecology of the Mediterranean monk seal is still limited. Data relative to important population factors such as reproduction rate, mortality, age structure, migration, home range, epidemiology, behaviour and food preference are either scarce

or non-existing Research on a long-term basis, ensuring the continual collection of data on such a long-lived and rare species, is necessary in order to acquire essential data that will allow the detailed design of effective conservation measures in the near future. Within this frame, the systematic and regular monitoring of the populations' status, using the existing scientific methodologies, is considered integral part of the research on the species and should be continued. However, at this stage, the use of additional research methodologies, such as telemetry, photography, and video, is necessary, since they can provide previously not available data on the ecological requirements of the species.

"However, research by itself does not constitute a conservation measure nor is it capable of reducing the threat of extinction. It should be emphasized that the up-to-date experience has proven that restricted research activities, such as habitat surveys scattered in time and space, without strict selection criteria for the site to be studied and without considering a follow-up, are of limited value in evaluating the status of the population or the use of habitat. The aim to cover as soon as possible the entire country with scattered surveys is not essential. Moreover, such activities can create a negative attitude to the local people of the area under consideration. For the above reasons, any research field activity within the framework of a national strategy for the conservation of the species should be included in a broader long-term scheme of activities, should be accompanied by public awareness programmes, and should involve as much as possible the local people, thus ensuring the maximum acceptance for conservation measures."

While monk seals numbers decreased in Greece, scientific knowledge on the species was substantially advanced during the 1996 – 2008 period. Research programmes were most notably carried out by scientists – in large part supported by MOM - using all possible sources of data, collected both on a regular basis (through the RINT programme; the systematic monitoring of specific monk seal concentrations in the NMPANS and in the Kimolos and Karpachos island complexes; the systematic performing of necropsies of carcasses found throughout the national coastline; and the rehabilitation of wounded, sick or orphan animals *in situ* or in Alonissos' *Seal Rehabilitation Centre*), and opportunistically during short-term research campaigns to specific parts of the country or with a specific research target.

The information thus collected was summarised and presented in a large number of scientific publications, conference presentations and project reports, covering a number of topics relevant to the biology, ecology and conservation of the species, including the following (for full citations please see Sections 8 and 9):

- Ecology, diving, habitat use (Dendrinios et al. 1999a,b, 2000, 2003, 2006a,b, 2007a,b,c,d; Karamanlidis 1997; Tounta et al. 1999).
- Distribution (Adamantopoulou et al. 1998a, 1999a, 2007; Akriotis et al. 1998; Panou et al. 1999, 2002).
- Population monitoring (Dendrinios et al. 1996 a,b, 1999c; Karamanlidis 2000, Karamanlidis et al. 2004; Kassimi 1997; MOM 1998a,b,c, 2001a, 2003, 2004a, 2005a; Panou et al 2002b).
- Behaviour (Adamantopoulou et al. 1999 c, d; Margaritoulis et al. 1996; van Bree and Panou 2000).
- Conservation status (Dendrinios 1998a,b; Dendrinios et al. 1998; MOM 2007b).
- Pollution (Dosi 2000; Dosi et al. 2002a,b; Borrell et al. 2007).
- Phylogeny and genetics (Fyler et al. 2005; Pastor et al. 2007).

In addition, field research and monitoring activities have led to the development of a central monk seal database and of an extensive tissue bank managed by MOM. The information contained in the central monk seal database spans two decades, covers the entire Greek coastline (including the most important populations and habitats), and was recently transposed on a GIS platform. Another important achievement, with long-term ramifications for advancing further the knowledge on the

species' biology, was the creation of a monk seal tissue bank containing >2,200 preserved tissue samples of various types from more than 140 individual seals from all over Greece. Several samples have already been used for diagnostic or research purposes, while the rest, on the basis of a standard agreement with MOM, are available to the scientific community.

Conclusions: In 1996 knowledge of Mediterranean monk seal biology and ecology was extremely scant and rudimentary. Advancement in knowledge obtained during this period – undisputedly a great achievement of the 1996 Strategy - is not only intrinsically valuable because it created the foundations of monk seal science – much needed in Greece as elsewhere - that were previously inexistent; it also clarified what knowledge still needs to be collected which is essential to conserving the species, while allowing to relegate questions related to basic science, having a more indirect relevance to conservation, to lower priority levels. Research has been one of the fields in which most of the progress was achieved as far as the implementation of the 1996 Strategy is concerned, perhaps because the involved organisations, in spite of the inherent difficulties in studying such a rare and elusive marine mammal, were able to proceed at their own pace without the disadvantage of the obstructive interactions with institutions, organisations and stakeholders involved in management and conservation matters. Surprisingly, most scientific contributions came from NGOs rather than from academia, contradicting expectations in a nation having such a large contact surface with the marine environment, endowed with such a rich and intriguing marine fauna, and with a zoological tradition dating back no less than to Aristotle.

5. Rescue and rehabilitation of sick, wounded or orphan animals

In 1996, the National Strategy called for:

"An additional factor of population decline is mortality of wounded, sick, or orphan new-born animals. Even though, the existing data do not allow assessing the significance of this factor, the status of the species makes responding to such incidents necessary.

The rescue, treatment and rehabilitation of such individuals under specific and strict veterinary, biological and zootechnical conditions is being already performed successfully. Furthermore, under such conditions, data relative to the development, physiology, parasitology, virology, bacteriology, behaviour, veterinary care and release procedures can be collected, while this is not possible in the wild. Additionally, knowledge related to holding the species in captivity will be essential for the conservation of the species in cases of emergency (catastrophes, epidemics, breeding in captivity). Lastly, it should be noted that this measure has a significant indirect effect in the sensitisation of the public, especially of the local people.

"However, the evident ultimate goal of such a programme, namely the release of animals in their natural habitat and their conservation, makes the effective implementation of the other measures imperative and should not be considered independently from them."

The 1996 Strategy rightly emphasized the value of rescue and rehabilitation of individual seals to ensuring that as many individuals as possible are recovered and secured in the gene pool of an already small population, and to develop skills for providing veterinary care to monk seals, which may become crucially important in case of catastrophic events.

Throughout the 1996 - 2007 period, MOM's Rescue and Rehabilitation Team operated continuously and rescued and provided first aid *in situ* to 24 individual monk seals reported and found stranded (i.e. orphan, wounded, sick, etc.) at any location within Greece. Three more were found in 2008, reaching a total of 27 (Table 6, Fig. 3). Of these, 15 were rehabilitated and released (and another

being in rehabilitation during the preparation of this document), bringing to almost 60% the success rate of the programme.

When the condition of an animal required prolonged treatment, the animal was transferred to the *Seal Rehabilitation Centre* in Alonissos, where a strict treatment and rehabilitation program was provided with the aim of releasing a healthy seal back to its natural environment. All animals that survived were released within NMPANS. During the treatment programme data were collected on several biological parameters (i.e. growth, dentition, moulting, behaviour, pathology, as well as details on the ecology of the released, satellite-tracked seals;) and biological samples were stored in MOM's tissue bank.

Between 1999 and 2000 a detailed operational protocol for the rescue, treatment, rehabilitation, release and post-release procedures of monk seals was prepared by MOM. The protocol, reviewed by a group of specialized scientific advisors, was adopted as the standard operational procedure for MOM's rehabilitation programmes. Detailed information on the operations was provided in documents listed in Sections 8 and 9.

Location found	Date found	Symptoms	Rehabilitation successful? ¹⁵	Date released	Notes
Evia	24/11/1995	Extreme weakness, hypoglyc., intest. parasitosis, infections, gastrointest. problems.	yes	20/04/1996	♀ pup
Psara	26/1/1996	Morbillivirus	no		Adult ♀ died 27/11/1996
Thessaloniki	17/2/1997	Eye injury, dehydration, unusual behavior, molting	yes	23/2/1997	Adult ♀
Leros	23/3/1997	Entanglement in fish cages	yes	23/3/1997	juvenile ♂
Attiki	15/6/1997	Low weight, weakness, eye infection, photophobia, passive behavior	no		Adult ♀ died 18/6/1997
Ikaria	20/12/1997	Weakness, severe dehydr., hypothermia, parasitic infection, anemia, very low weight	no		♀ pup died 26/12/1997
Ikaria	1/11/1999	Weakness, severe dehydr., hypothermia, parasitic infection, anemia, very low weight	no		♂ pup died 11/11/1999
Chios	13/11/1999	Entanglement in fishing nets	yes	13/11/1999	pup
Evia	1/12/1999	Old injuries in head and flippers	yes	2/12/1999	Adult ♂
Attiki	29/9/2000	Unusual behavior	yes	29/9/2000	juvenile ♂
Evia	6/11/2000	Serious injury at the right eye	yes	7/11/2000	Adult ♂
NMPANS	4/12/2000	Very low weight, hypothermia, passive, severe dehydration	no		♀ pup died in 4/12/2000
Skiatos	7/12/2000	Trapped in water pipe	yes	12/12/2000	Adult ♂
Attiki	27/11/2001	Molting process	yes	12/12/2001	Adult ♀
Lipsi	3/12/2001	Dehydration, hypothermia, infection.	no		♂ pup died in 7/12/01

¹⁵ Success presumed. No information on reproductive output of released animals is available.

Evia	31/10/2002	Low weight, dehydration, very young age.	no		♀ pup died 8/11/02
Karpathos	29/12/2003	Weakness, dehydration, strong anemia, superficial trauma	yes	22/5/2004	♂ pup
Kos	7/10/2004	Weakness, dehydration, temperature, superficial wounds, conjunctivitis	no		♂ pup died 22/10/2004
Tinos	25/06/2005	Right eye lost and infected from injury, left eye infected, possible passive behavior	yes	8/8/2005	♀ pup
Isthmia	25/6/2005	Unusual behavior, friendly/aggressive to humans	yes	25/6/2005	juvenile ♂
Evia	2/11/2006	Weakness, parasitic infection, extreme anemia, dehydration, light injuries	no		♂ pup died 4/11/2006
Kefalonia	9/11/2006	Unusual habitat/ possible disturbance of mother/pup bond	yes	11/11/2006	♂ pup
Argolida	5/9/2007	Unusual habitat/ possible disturbance of mother/pup bond	no		♂ pup. Disapp. 6/9/2008; poss. death
Tinos	2/10/2007	Dehydration, starvation, open umbilicus, deep infected wounds by rocks, unstable temperature, weakness	yes	2/2/2008	♀ pup
Evia	19/9/2008	Less than 24 hours old, weak, gastrointestinal problems, very high temperature	no		♂ pup died in 19/9/2008
NMPANS	18/10/2008	Infected left eye	yes	18/10/2008	♂ pup
Leros	10/12/2008	Dehydration, deep infected wounds by rocks, unstable temperature, weakness	N/A	N/A	♀ pup Rehab. ongoing

Table 6 – Summary of monk seal rescue and rehabilitation activities in Greece between 1995 and 2008.

Since 1990 all operations had been conducted in the *Seal Rehabilitation Centre*, a mobile treatment and rehabilitation unit donated by the Dutch Seal Treatment Centre, the Zeehonden Creche Pieterburen. Between 1999 and 2000 a small permanent treatment facility was designed and built by MOM in cooperation with the Ministry of Environment and the Prefecture of Magnesia within the Gerakas Research Station in Alonnisos, as an addition to the existing mobile unit of the *Seal Rehabilitation Centre*. The new facility, however, never became operational because, contrary to expectations, road access and sea water supply was not secured by the State authorities.

During this period, progress was also made in the development of legislative measures to ensure the best treatment of stranded animals. In 1998 a detailed proposal for new legislation for the operation of wildlife treatment and rehabilitation programs in Greece was drafted by Greek NGOs (including MOM) involved in wildlife treatment and rehabilitation. The proposal, which included operational and veterinary protocols, staff and facility specifications, licensing and verification procedures for all wildlife hospitals and first-aid stations, was fully adopted by the State competent authorities and led to the passing in 2001 of new legislation that is considered innovative at the European level.

In 2002, MOM applied to the Ministry of Agriculture, the competent authority for licensing permits of all wildlife hospitals, for an official permit to operate the mobile unit based on the new relevant legislation mentioned above. Even though all MOM's operational and staff specifications met the new standards, the Ministry considered the mobile unit's location inappropriate, issued a permit to operate it as a first-aid provisional facility, and recommended the construction of a new facility in a more suitable location. In 2007, a campaign was launched by MOM for the construction of its own new treatment and rehabilitation facilities in Alonissos; work is ongoing and that facility is expected to become operational in 2010.

Conclusions: The rescue and rehabilitation of wounded, sick and orphaned animals was a very successful aspect of monk seal conservation carried out by NGOs during the 1996-2008 period, and should be continued. However, many problems remain and there is great room for improvement. First, operations need highly specialised expertise which is possessed by professionals who can only be engaged part-time, given that most of the seals in need of rehabilitation were found between September and December (Fig. 3).

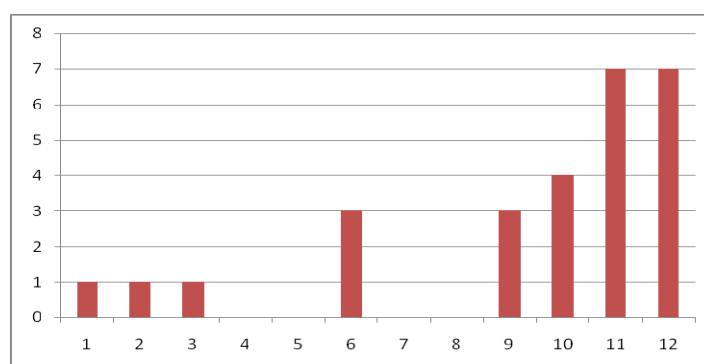


Fig. 3 – Seasonal distribution of monk seal rescue and rehabilitation events (1995-2008).

Second, operations have been conducted throughout the period in a mobile, sub-optimal unit, while a state-of-the-art facility is still in the process of being secured. Third, each rehabilitation is a very costly exercise (about 80 k€ from rescue to release, at 2008 purchasing power), which cannot be secured in advance given that the money is fund-raised by MOM on a case by case basis instead of being institutionalised. Fourth, inter-island transportation is greatly complicated by the peculiar geography of monk seal habitat, further impaired during the winter months, so that great effort is required in containing time-lag between reception of the alert and rescue within a 24-h span. In this regard, the in-kind cooperation and support from Port Police authorities and personnel have often been a key element in the success of rescue operations.

6. Reduction of pollution

On this issue, the "1996 Strategy" stated:

"The levels of marine pollution do not appear to be the main cause of decline in the case of the Mediterranean monk seal. In Greece levels of pollutants are at present considered to be low relative to other countries. Based on the scarce existing data pollution does not appear to have seriously affected the Mediterranean monk seal. However, indications from other marine mammals imply that high levels of pollutants can cause serious problems to their immune system as well as significant reduction to their reproductive rate. Furthermore, in cases of large scale pollution disasters (oil spills, etc.), the consequences are serious and immediate since populations are condemned - if they do not escape - and habitats are destroyed. The above makes the task to

reduce to a minimum the possibility of pollution, necessary. Lastly, taking into account the characteristics of the species, mechanisms of immediate response in cases of major catastrophes must be established."

There is wide consensus that marine pollution continues to be a secondary concern for monk seal survival in Greece, due to the overall conditions of most of the Greek coastline, which is considered having in general a low level of pollution compared to most of the Mediterranean. However, monitoring the quality of monk seal habitat and in particular water and trophic web quality is important because of the high vulnerability of high-level predators to contaminants. One amongst the few available studies conducted on this subject suggested that Mediterranean monk seals are not immune from trace elements contamination (Yediler et al. 1993). During the 1996-2008 period, a number of initiatives and activities were implemented to address pollution concerns.

In 1996, MOM, Greenpeace Greece and Archelon/Sea Turtle Protection Society proposed to the Greek Government to designate the NMPANS and the Laganas area in Zakynthos as Particularly Sensitive Sea Areas (PSSAs) within the International Maritime Organisation (IMO) that should be avoided by tankers and other dangerous cargo ships (see also Triantafyllou 2004). The possibility of formally proposing such areas for consideration by IMO is apparently still considered by the Greek Government (MOM, pers. comm.).

In 2000, the national port police authorities adopted a Contingency Plan for local rapid response to oil spills. In this context an agreement was reached between MOM and the Port Police of the Sporades to include specific monk seal habitats as priority areas in the Contingency Plan for the NMPANS, and agreed to ensure that specific monk seal expert support is provided in the event of an oil spill. This matter was further addressed when the Ministry of Mercantile Marine developed in 2003 a National Plan for responding to oil spills and other marine disasters. MOM was invited to propose a list of important monk seal habitats¹⁶ to be included as priority areas for marine mammals, which were included as target areas for specialized treatment and cleanup operations in case of an oil spill.

During the 2003-2007 period, MOM participated in the development of Sea Alarm, an international network for responding to marine environmental disasters with emphasis in the rescue and treatment of wildlife. The aim of the network is to provide emergency expertise, personnel, equipment, financial resources and coordination of international efforts to support local governments in responding to oil spill crises.

Lastly, in 2005, MOM in collaboration with SAD-AFAG, a Turkish NGO involved in the conservation of the monk seals in Turkey, developed a joint Species Specific Contingency Plan, to be promoted with the respective national authorities, for mass mortality events in the Eastern Mediterranean, including a joint plan to respond to eventual oil spills. The Plan is pending to be adopted by the competent authorities of both countries.

Conclusion: Compared with the present, clear dangers posed to monk seals by locally acute conflicts with fisheries and habitat destruction, so far pollution has been taking the back stage in the frame of monk seal conservation efforts. This however may change soon, particularly in view of the opening, forecast in 2011, of the Bourgas - Alexandroupolis pipeline, which will make available for shipping up to 53 million tons of oil per year in the Northern Aegean, and open the region to the possibility of a major environmental catastrophe. In view of such eventuality, cooperation between the Greek and Turkish marine conservation community seems even more needed and urgent.

¹⁶ See Appendix.

7. Reduction of overfishing

In 1996, the National Strategy called for:

"In the context of the overall seal-fisheries interaction, overfishing (with either legal or illegal means) is one more factor that may affect the Mediterranean monk seal negatively. The over-exploitation of marine resources may cause a reduction in food availability. Food shortage, in turn, may affect growth rate, pregnancy and survival.

"Overfishing may be reduced through adequate management policies in fisheries. Major problems are the scattered, uncoordinated and sometimes insufficient, contradicting and obsolete regulations of fisheries legislation (high numbers of amateurs, low penalties, etc.), the lack of knowledge about marine resources and their regeneration, and illegal fishing activities. Illegal fishing is the only aspect of the over-exploitation of marine resources which can be addressed in the short term through the strict enforcement of the already existing laws by the responsible authorities. The design of an integrated fisheries policy is a rather long term task, which is though necessary to be initiated immediately in order to have timely results. Integral parts are the research in fisheries and the review of the existing legislation for the elaboration of future policies aiming at the regeneration of the marine resources and their sustainable use taking into account the needs of the country in fisheries harvest as well as the requirements for environmental conservation.

"Lastly, the reversal of the over-fishing may mitigate the seal damages of fishing gear, the main cause of deliberate killing of the animals."

It is still unclear whether monk seals are directly affected by overfishing, something which should be investigated through trophic web studies in monk seal habitat. However, overfishing certainly indirectly impacts on monk seal survival, because where fishing is scarce damages by seals to small-scale artisanal fishing gear and catch exacerbates the fishermen's hostility towards the seals (Dendrinos et al. 2007e). This, in turn, triggers direct kills which is recognised as the main monk seal source of anthropogenic mortality and the greatest threat to their survival.

Therefore it can be argued that, albeit indirectly, overfishing should be included amongst the greatest monk seal conservation concerns, and that the implementation of a sound coastal fishery management policy at the national level remains one of the most urgent and sensible conservation action that Greece should address.

Conclusion: During the 1996-2008 period, no direct initiatives or activities took place in relation to this particular field. This is rather unfortunate given the wide level of over-exploitation of fishing resources in Greece (e.g., Stergiou et al. 2007a,b), and the implications of such state of things for monk seal conservation. However, a specific Action Plan is currently being developed within the framework of the "MOFI" project, and included within the framework of the "New Strategy".

8. Improvement and implementation of existing legislation

Under this heading, the "1996 Strategy" stated:

"The existing national and community legislation covers satisfiably most aspects of the issue. However, there is a legislative gap in the Presidential Decree 67/1981 relative to the penalty in violating the law, which should be remedied the soonest possible.



"The implementation of the legislation is however insufficient due to the particularly large and fragmented Greek coastline in conjunction with the poor means of control (in terms of infrastructure and personnel), and the lack of information. The improvement of the means of control and the timely and accurate information are imperative measures. However, apart of the above, taking into account the characteristics and structure of small communities throughout Greece, involvement and awareness of the local people in conservation is expected to considerably improve the enforcement of the legislation."

During the 1996-2007 period some innovation was achieved in terms of improvement and implementation of national legislation relevant to monk seal conservation, including the formal establishment of special MPAs and their management bodies (detailed in Section 6.1), and the adoption in 2001 of new regulations concerning the operation of wildlife treatment and rehabilitation programmes, based on proposals (including operational and veterinary protocols, staff and facility specifications, licensing and verification procedures for all wildlife hospitals and first-aid stations) submitted by MOM and other Greek NGOs involved in wildlife treatment and rehabilitation (Section 6.5).

In 2002 new legislation was passed setting the legal bases for the establishment and operation of the managing bodies of protected areas in Greece, in which several, but not all of the NGOs' proposals were accepted.

A number of initiatives were undertaken by MOM to support the Hellenic institutions to improve and implement national laws relevant to the conservation of monk seals and their habitat. These include:

- scientific support (with information on monk seal critical breeding habitat and on the distribution and status of the species) provided in 1996 in cooperation with other NGOs, to the designation by a consortium of Greek universities and research institutes of a national list of Natura 2000 sites;
- a guarding programme for the NMPANS, implemented from 1996 to 2003 by MOM in collaboration with the Ministry of the Environment and the local port police. During this period several cases were brought to court and numerous fines were issued which contributed to a substantial reduction of illegal activities. Based on the experience gained, MOM proposed to the relevant Ministries (i.e. environment, agriculture and mercantile marine) a series of amendments to the existing legislation and the penal and administrative procedures relevant to the guarding of protected areas in Greece. These, however, have not been adopted yet.
- field testing and setting up of pilot guarding systems aiming at the reduction of illegal activities, in anticipation of the establishment of nature protection areas in Karpathos and Kimolos. Personnel was trained in both areas, and patrol boats were built and utilized in 2007 by the management body in Karpathos;
- elaboration in 2000 of operational protocols for monk seal research in Greece, and a proposal for the formal establishment of a *National Monk Seal Conservation Committee* tasked with reviewing and coordinating research and conservation initiatives at the national level. The Ministry of Environment adopted the proposed protocols, but did not create the committee.
- In 2003-4, MOM was nominated with three other environmental NGOs in the National Advisory Body for Protected Areas, a committee having the mandate of coordinating conservation activities within the Greek protected areas and developing the legal, operational and financial framework for the effective operation of a national protected area network. Disabled to a large extent, due to lack of financial and effective political support,

the committee was dissolved in 2005 following a change in the central government after the national elections.

Conclusions: From the formal point of view, the current national legislation can presently be considered adequate to protect monk seals. The only aspect that seems important addressing is the possibility of conceding exclusive fishing rights to local fisheries within specially zoned MPAs, established to protect monk seals and other endangered species or habitats. Such possibility is apparently excluded by the current Greek constitutional law (MOM, pers. comm.). As argued in a recent paper, bioeconomic theory and case studies suggest that rights-based catch shares can provide individual incentives for sustainable harvest that is less prone to collapse (Costello et al. 2008), and would be prone to motivating local fishermen to endeavour in greater stewardship for the marine environment they subsist on.

9. Breeding in captivity

The "1996 Strategy" stated:

"Captive breeding and relocation programmes have made significant contributions to the conservation of some endangered species (e.g. blackfooted ferret, Arabian oryx, Mauritius kestrel) and should be considered as a potential conservation measure for the monk seal in Greece. However, such programmes are expensive and the establishment of a captive population is likely to involve significant human intervention in the wild population. In addition, some information which is crucial for evaluating the probability that a programme will be successful, such as the survival to first breeding of monk seals in captivity, is not available at present."

"The costs and benefits of any captive breeding programme will have to be carefully evaluated before it is initiated. This evaluation will require detailed information on: the numbers, origin, age, sex and genetic structure of the initial population; the location, history, facilities and financing of the place where captive breeding will take place; and the expected contribution of the programme to the long term conservation of the species. The release of animals from a captive breeding programme will not make a significant contribution to the conservation of the species unless all the other measures outlined in this proposal are also implemented."

During the 1996-2008 periods there was no proposal or initiative relevant to monk seal captive breeding in Greece. By contrast, MOM and other Greek NGOs wholeheartedly supported an international campaign against the initiation of a captive breeding programme in the Canary Islands, proposed in the 1996-1999 period.

Conclusion: Captive breeding of monk seals in a country where the species still regularly breeds in its natural habitat makes no conservation sense. The status of the species still does not warrant recurring to such extreme measure, and will pose significant risks to individual seals in addition to distracting attention, effort and resources from the most sensible actions, centred on protecting the seals in their habitat. For these reasons, captive breeding will not be contemplated in the "New Strategy".

10. Translocation

The "1996 Strategy" stated:

"Translocation programmes have made significant contributions to the conservation of some endangered species (e.g., the initial translocation of sea otters from Alaska to California) and should be considered as a potential conservation measure for monk seals in Greece. However, such programmes are expensive, and obtaining animals for translocation is likely to involve"

significant human intervention in the wild population. In addition, some information which is crucial for evaluating the probability that a programme will be successful, such as the survival of animals in transit and after release, is not available at present.

"The costs and benefits of any translocation programme will have to be carefully evaluated before it is initiated. This evaluation will require detailed information on: the numbers, origin, age, sex and genetic structure of the animals to be translocated; the location, history, suitability and facilities for follow up at the place where translocated animals will be released; and the expected contribution of the programme to the long term conservation of the species. Translocation of animals will not make a significant contribution to the conservation of the species unless all the other measures outlined in this proposal are also implemented"

During the 1996-2008 period, there was no proposal or initiative in relevance to translocation within Greece. In 1998 the Croatian Government and local NGOs proposed to translocate a number of monk seals from Greece to selected locations on the Croatian coasts. The Greek Ministry of Environment in close consultation with MOM rejected the proposal.

Conclusion: The possibility that Greece – the country having the largest number of Mediterranean monk seals - may be approached in the future with a request for monk seal donations for reintroduction elsewhere in the Mediterranean cannot be discounted. While applying reintroduction to promote monk seal conservation might under certain circumstances be a justified measure, it is important to consider that translocation of Mediterranean monk seals has never previously been attempted, and holds considerable potential risks both to wild populations and to the translocated individuals themselves. Therefore, a careful assessment of such a measure should be made to determine in the first place whether it is (a) necessary and (b) feasible. Necessity stems from the conviction that stable monk seal recovery throughout its former geographic range will not occur without the implementation of a reintroduction programme. Such necessity has not been convincingly demonstrated yet. Concerning feasibility, the foremost condition that must be met for such an initiative to be carried forward entails that it should not in any way negatively affect the "donor" colony's conservation status and future viability. Without question, such condition cannot possibly be met at the present time in the case of monk seals in Greece. Considering the critically endangered status of the species, any translocation initiative within Greece, or from Greece to other Mediterranean countries, should be considered inadmissible within the foreseeable future. For these reasons, the possibility of translocation is not contemplated in the "New Strategy".

11. Concluding remarks

Almost thirteen years after the "1996 Strategy" was launched, the species' conservation status has changed little: monk seal killings still frequently occur in Greece, and most monk seal critical habitats still lack effective protection. The Strategy was an excellent and comprehensive document, ahead of its times, and certainly cannot be saddled with the responsibility for such failure. The main problem lies with the fact that the Strategy advocated actions (in particular, establishing protected areas and dealing with direct killings) that fall within the exclusive competence of the State's governing authorities, which will act (or not act) on the basis of their autonomous decision process, policies, and priority setting. This consideration, coupled with the current condition of low to absent accountability of the State as far as the failure of environmental protection is concerned, is fully sufficient to explain the slow progress of monk seal conservation in Greece.

However, in spite of the clear responsibilities resting with the European and national institutions in terms of marine environmental protection, it appears that a healthy and more pragmatic attitude

should involve an effort of implementing good science-guided governance at a local level (i.e., within the coastal communities that live and work in monk seal habitat), striving to harmonise humans with the marine ecosystems in which they exist. This should stimulate the development of local, ecosystem-based management systems capable of engendering sustainability and coexistence with the monk seals, and provide, insofar as possible, opportunities to central governmental bodies for not being as callous and obstructive of the conservation process as they have been during the recent past.

A more vigorous local action, and a greater emphasis in addressing the seal – fishery interactions (as argued in the “Conclusions” in Section 6.2), would therefore seem the most important lessons learned from the experience of the “1996 Strategy”. That Strategy had perhaps placed too high expectations on the role of the Greek State in monk seal conservation. As it turned out, in spite of governmental inaction, by virtue of a combination between the activism of civil society (represented by a handful of NGOs) and the peculiarities of the species’ ecology and habitat, there are still breeding monk seals in Greece. In fact, if on the one hand it is true that between 1996 and 2008 the population has not shown clear signs of recovery, it is also true that it has not demonstrated to be declining, either.

However, it would be foolish to bank on such condition, and be remaining satisfied about of a species which has made a virtue of tethering on the brink of extinction. Hence, the need for a “New Strategy”.

PART THREE

NATIONAL STRATEGY AND ACTION PLAN FOR THE CONSERVATION OF THE MEDITERRANEAN MONK SEAL IN GREECE, 2009-2015

1. Goal

The long-term goal of the strategy is:

"to assure the recovery and long-term viability of Mediterranean monk seals in Hellenic seas"

2. Rationale for the 2009-2015 Conservation Strategy and Action Plan

In spite of its poor conservation status, it is still possible to save the Mediterranean monk seal.

Monachus monachus continues to be fully entitled to its *Critically Endangered* Red List category, just like it was declared by IUCN more than 13 years ago. The species' overall trend is still negative, and there are no clear signs of its recovery anywhere in the Mediterranean. However, against expectations, small breeding groups of seals still exist in Greece, thereby providing a reason for hope. The roadmap for the species' recovery – outlined here – is quite clear; legal provisions could not be more favourable; ecological and veterinary knowledge, although incomplete, is substantive and helpful; threats are well identified, and the measures to address them straightforward.

So why is it so difficult to pull Mediterranean monk seals from the brink of extinction, and push them towards their recovery? Difficulties lie in the fact that any effort to conserve the marine environment and its biodiversity, and in particular Mediterranean monk seals that can be so easily identified as a symbol of such conservation action can only be driven by values. Protecting Mediterranean monk seals and their habitat in the territory under its sovereignty is an obligation that Greece has explicitly committed to, on the basis of a large number of national, regional, European and international legal instruments (see Sections 4 and 5 of Part One for details). However, a monk seal future will be secured in Greece only if a significant portion of Hellenic civil society will attribute to the seals the value they deserve, and if saving monk seals from extinction will be seen as the epitome of reversing the devastating trend of loss of naturalness which is plaguing the Mediterranean, Greece included. Unfortunately we are far from this condition, because most of the general public appears to be indifferent to the plight of the monk seal and oblivious of the many problems plaguing its habitat. Therein lays the main challenge that this Strategy must address.

Yet, there is one more value to be added to a desirable engagement of the Hellenic nation in monk seal conservation. Protecting monk seals in Greece greatly transcends the nation's horizons. As the species' decline progresses within the Mediterranean, with the complete disappearance of breeding groups from the western Mediterranean and Black Sea, the burden of monk seal conservation becomes increasingly the sole responsibility of a handful of countries in the Eastern Mediterranean. Of these, Greece is the nation which still contains most of monk seal habitat and the highest number of monk seals. Here, scattered across remote and less disturbed locations of the country's highly fragmented coastlines, monk seals continue to attest their ability to reproduce. Because the greatest number of remaining Mediterranean monk seals is now in Greek territorial waters, protecting the species in Greece is by far the single most important measure that can be achieved at the global level to reverse the current downward trend of the species over its entire range within the Mediterranean basin, and to save it from extinction.

The "New Strategy" is built on the foundations laid by the "1996 Strategy", capitalising on its achievements and learning from its weaknesses and failures as discussed in detail in Part Two. Most of the conservation tools and means identified in the "1996 Strategy" are conserved in this document, but rearranged in the light of progress achieved in the various fields with the accumulated experience. Considering the critically endangered status of the species, unlike in the "1996 Strategy" neither captive breeding nor translocation is contemplated here. The main difference between the two strategies lies in method. To provide an easier means to assess future achievements, the new



strategy is articulated in goals, objectives and actions, all linked together into a framework which is loosely inspired to the Logical Framework Approach. The Strategy contemplates (see Section 2) one long-term policy goal (Section 1), defines four objectives (Section 3) to be met to attain the goal, and identifies the actions that are recommended to meet the objectives. Actions are described in an Action Plan (Section 4) and listed in tabular format in the Implementation Schedule (Section 6), where indicators of achievement and are also suggested.

3. Objectives

In order to attain the strategic goal, the following four objectives are identified, to be reached by 2015:

- Objective 1. Monk seal conservation is established as a national priority.
- Objective 2. Knowledge of monk seal ecology and biology important for the conservation of the species is secured.
- Objective 3. Areas containing monk seal critical breeding habitat in Greece are identified, legally protected and organised into a functional network of protected areas in which monk seal numbers are stable or increasing.
- Objective 4. Monk seal conservation measures are legally adopted and effectively implemented throughout national waters, so that threats are diminished and monk seal populations and habitat nation-wide are not lost.

3.1. Rationale for the objectives

The Strategy is articulated over a seven-year period, and a number of mutually reinforcing objectives are devised to reach the goal. This reflects the fact that monk seals are affected by a plurality of different threats, and therefore simultaneously addressing all the threats during the stated period sounds like the most effective strategic decision. However, even from within such a pluralistic frame of mind it is important to avoid losing sight of the fact that single threats have a disproportionate importance relative to the others. For example, eliminating the deliberate killing of seals by fishermen might make by itself a tremendous difference, perhaps to the point of bringing about a reversal of the declining trend, all other factors being unchanged. Such considerations are of a fundamental importance when neither the available resources nor the available time are infinite.

To be effective, the Strategy will have to implement monk seal conservation actions targeting the Hellenic society principally at two different levels: local and national. Actions at these levels will have to be coordinated, to be mutually reinforcing.

At the **local level**, the areas identified as containing monk seal breeding habitat, i.e., where pupping still regularly occurs, provide a unique opportunity for the establishment of "cells of excellence" where the various indicated activities are implemented through a virtuous blend of community participation, the application of solid science, wise governance, mutual trust and economic vision. Such important areas for monk seals should be singled out as demonstration cases - where monk seal strongholds can be strengthened, seal groups maintained and made to grow, local communities made to become stewards of the marine environment and of monk seals as its flagship – and used to propagate within Greece, and elsewhere where monk seals still occur, a winning recipe for the species' stewardship. Models of such cases, albeit still imperfect, already exist (e.g., Karpathos), and should be vigorously improved, with full institutional support, and replicated elsewhere. Ideally, the leading role in such processes should gradually migrate from specialised, centrally-based NGOs (such as MOM) to local constituencies, tightly connected with the local realities but still operating within rigorous conservation, governance and ethical standards (this may take a long time). This would leave to centrally-based NGOs the equally important functions of strategic coordination and support.

Locals should react to the current degrade of their marine territories, which is under everyone's eyes, by deciding to take the matters in their own hands and act. If the impetus for action comes from inside, limiting outside contributions to support, facilitation, connectivity and capacity building, expectancy of success will be vastly increased. Economic incentives deriving from a wiser stewardship of the marine environment – e.g., the creation of MPAs to protect fish stocks and local economies and monk seals - must carry rapid, clear and indisputable advantages to the local communities. The burden of coexisting with monk seals and protecting them should not solely rest on the shoulders of the local communities.

At the **national level**, several directions should be followed at the same time. First, saving the monk seal from extinction must symbolise the championing of a national effort, involving everyone, to restore the Greek marine environment to its pristine status. The sea and coastal area are among Greece's most important natural asset, with relevant economic implications (e.g., tourism). The marine environment in Greece is generally considered to be in good status compared to the rest of the Mediterranean; however this is due to a relatively low population pressure (compared to European averages) over a very long coastline, rather than to deliberate stewardship. Quite to the contrary, Greece's attitude towards its marine environment (outside of the narrow circle of the conservation community) is characterised by institutional nonchalance combined with callousness by individual users, who appear to be taking the marine environment's goods and services for granted in spite of generalised mistreatment. In fact, signs of degradation (e.g., overfishing, coastal mismanagement, pollution, biodiversity loss) are already quite visible in an increasing number of locations, although insufficiently perceived by the public perhaps under the effect of a "shifting baselines" syndrome. The political advantages of saving Mediterranean monk seals, as well as the political costs of letting them become extinct; have not been fully grasped by the relevant sectors of the Hellenic society. Decision makers in Greece should be challenged by civil society through carefully designed campaigns by concerned NGOs, so that embarrassment from neglecting effective monk seal conservation action becomes unbearable, while acclaim for making concrete progress becomes for them a significant political asset. The Greek NGO community, and MOM in particular, has already achieved substantial progress in this direction; efforts must be continued with renewed energy. To this end, the appropriate legislative and institutional framework must be structured in order to ensure the effective implementation of conservation measures. A monk seal conservation strategy and its implementation must be established nationally, as well as at the European and international levels, as a best practice example, and solidly integrated within the wider strategy for the conservation of the marine environment in Greece. Ideally, the monk seal should become the symbol of a renewed effort towards marine conservation in Greece. This condition urgently needs to be reversed if Greece is to continue capitalising on its marine environment as one of its fundamental natural assets. Second, knowledge of monk seal ecology and biology, important for conservation actions, must be secured. Such knowledge may not be essential to monk seal recovery in the immediate: as argued above, extremely urgent management measures such as halting the persistence of deliberate seal killings hardly need new scientific knowledge. However, a continued refinement of knowledge through monitoring activities and research programmes, in conjunction with appropriate management actions, will greatly strengthen and speed such recovery. Third, nation-wide conservation measures to address and mitigate threats through the regulation of human presence and of potentially harmful activities must be legally adopted and effectively implemented at the national level.

3.2. Explanatory comments of the single objectives

Objective 1. Monk seal conservation is established as a national priority.

The value of conserving Mediterranean monk seals in Greece must be fully appreciated and embraced by the nation at all levels of civil society. The imperative of conserving *M. monachus* in Hellenic national waters must be clearly adopted as a national priority and become the overarching

goal of a number of specific actions. The fact that monk seals still exist in Greek waters, and mostly there, should be seized as a rare opportunity for a display of excellence and best practice to be solidly integrated within a wider strategy for the conservation of the marine environment in Greece and in the wider Mediterranean at large at the national, regional, European and international levels, so that monk seals become the symbol of a renewed effort towards marine conservation in Greece. To this end, a number of conditions will have to be satisfied.

First, the appropriate legislative and institutional framework will have to be structured in such a way as to ensure effective implementation of monk seal conservation measures, and legislative gaps must be remedied. To facilitate the process, new legislation should include the formal establishment of a national *Monk Seal Conservation Commission*, mandated to oversee national monk seal conservation efforts, including the integration of monk seal conservation efforts into national policy for marine conservation, and the review and renewal of species-specific legislation granting adequate protection of monk seals and their ecosystem (inclusive of habitat, prey, and ecological relationships with human activities).

Second, considering that informing and educating the public is fundamental to ensuring widespread acceptance and collaboration, enforcement of laws relevant to monk seal conservation (e.g., against direct monk seal killings) will be complemented by a vigorous action of involvement and awareness of all relevant levels of the Hellenic society, and stakeholders disseminated across the small coastal communities in Greece, particularly where monk seal breeding habitat occurs. This will include envisaging a number of initiatives, such as the creation of a NGO Task Force for awareness, the engagement of professional PR support, the production of video material for the wider public, and the conduction of awareness campaigns targeting specific sectors of society. For example, awareness actions targeting tourists in locations known to host breeding monk seals, which may include fundraising through adoption programmes, will exert bottom-up pressure on the local communities (where monk seal killings still occur) which may greatly support the change of attitude in favour of monk seal conservation.

Third, the substantive conservation experience accumulated in Greece across the years should be disseminated within Mediterranean monk seal range states – with a special priority to be conferred on Turkey, Cyprus, Libya and Albania, given these countries' likely contiguity with Greek monk seals - to advance the species' conservation throughout its range, and to promote its recovery.

Objective 2. Knowledge of monk seal ecology and biology important for the conservation of the species is secured.

Nowhere is it more obvious than in the case of monk seal conservation in Greece that lack of action cannot rest on the excuse that scientific knowledge is still insufficient. We have previously argued that in this phase of Mediterranean monk seal conservation the actions that have greatest priority and urgency are management actions (e.g., stopping deliberate killing) that do not need substantial knowledge progress for their effective implementation. Nevertheless, basic knowledge of monk seal ecology and biology, still unavailable due to the particularly cryptic nature of monk seals and to the inaccessible environment in which they live, must be collected in parallel to management and conservation actions because it will significantly support the attainment of the strategic goal. Efforts should follow four main tracks:

a) The national inventory of sites where monk seal breeding still regularly occurs must be completed as soon as possible. Areas of fundamental conservation importance for monk seals, where significant pup production occurs, such as the recently-discovered location on the island of Gyros (on the doorsteps of Athens), may still be existing out there without anyone knowing it. The knowledge of monk seal presence and distribution in the country must be complete if this Strategy is to reach the desired results.

b) Methods for determining monk seal population size and trends in a given area (in this case, Greece) are still very crude and unable to provide the desired information with acceptable levels of accuracy. True, this is in large part due to the nature of the animals and to legitimate concerns that obtaining such data may involve risky invasiveness in critical habitat (i.e., caves), as well as unacceptable levels of disturbance. Nevertheless a concerted effort among world-wide specialists in marine mammal population ecology, including monk seal experts, should be stimulated to provide indications and guidelines for rapid and safe means of regularly measuring population sizes and trends, thus assessing the species' conditions with the frequency needed for conservation purposes.

c) The advancement of knowledge of monk seal ecology and biology relevant to conservation (e.g., individual seals' dispersal and home range patterns, monk seal population structure in Greece, feeding behaviour, ecology and trophodynamics, reproductive ecology and physiology) should continue as opportunities arise for the conservation ecologists active in the field, and will accrue to the current body of knowledge significantly supporting conservation decisions.

d) Finally, the socio-economic implications of monk seal conservation in Greece should be investigated, based on the consideration that a better understanding of the effect of human activities and of people's attitudes towards monk seals will provide ammunition for the improvement of conservation strategies. Studies quantifying economic advantages and disadvantages deriving from monk seal presence in a given area should also be conducted.

Objective 3. Areas containing monk seal critical breeding habitat in Greece are identified, legally protected and organised into a functional network of protected areas in which monk seal numbers are stable or increasing.

To meet Objective 3, three orders of actions will have to be implemented: a) conferring protected status upon all areas containing monk seal critical breeding habitat in Greece, b) ensuring that all monk seal specially protected areas are effectively managed, and c) linking together all monk seal specially protected areas into a functional network of MPAs.

a) Although highly desirable from the conservation standpoint, it is currently impossible to ensure that the entire Hellenic coastline where monk seals occur be afforded adequate protection against anthropogenic threats. A triage approach is therefore needed. Areas known to be of highest importance for monk seal survival, because they still host individuals that regularly breed, must be afforded better protection than what has been achieved so far. Many of such areas are still pervasively subjected to overfishing and intense human interference, perhaps even blasted by illegal dynamite fishing as well as legal military exercise bombing. Breeding and resting caves can still be entered by anyone at will, if physically possible even with motor vessels. The persistence of seals in such conditions of extreme disturbance is extraordinary, but cannot be assumed to last indefinitely. Key areas identified in the past (i.e. marine and coastal habitat containing feeding grounds and breeding sites such as caves and beaches), as well as new areas identified through actions implemented to reach *Objective 2*, must be legally protected as a matter of extreme urgency. This will be a daunting task, considering that in decades of efforts the Greek State managed so far to establish a very small number of them, a meagre percentage of the total needed (the lack of protection in the Ionian Sea is perhaps the most unfortunate example of this); however it will be a fundamentally important task, and a litmus test of whether Greece seriously intends to conserve its monk seals.

b) Protected areas for monk seals must be effectively managed through enforcement, regular monitoring, and active participation and full involvement of the local populations most affected by the protection measures. Zoning should be envisaged in such areas to reduce risk of monk seal by-catch. To ensure that monk seal numbers in important conservation areas are stable or increasing, first of all it will be necessary to intervene on the primary causes of mortality through continued monitoring, investigating the causes of mortality, and devising specific threat-abating measures. As

already argued in Section 3.3 (Part One), consensus building at the local level and the diffused recognition of the values of protecting monk seals and their habitat are essential prerequisites of the conservation effectiveness of protected areas designation and management. To this end, the full participation of local and other stakeholders is essential. This will include what may be considered the most difficult and delicate task of the entire strategy: conquering the heart of the locals (i.e. the people who coexist with the seals) to the cause of monk seal conservation. Locals (concerned residents, members of the fishing community, tourism industry practitioners, local authorities, and NGOs) must become convinced that protecting the monk seal is not only an obligation, but also, and most importantly, to their own advantage; damages which may occur to small-scale fishing from net depredation by monk seals must be dwarfed by far greater advantages deriving to residents by the complex of factors linked to a healthy marine environment, which is symbolised by the presence of the seals in the area. Once this is obtained, most other tasks will be downhill.

c) Finally, linking all areas into a national network (both ecological and operational), within the framework of the *Natura 2000* Network, will add further strength and stability to the system. There is growing evidence of the importance of biological connectivity and resilience in the face of climate change and habitat degradation. In this sense, MPA networks are viewed as increasingly valuable conservation tools, by facilitating integrated marine management through ecological, social and economical benefits.

Objective 4. Monk seal conservation measures are legally adopted and effectively implemented throughout national waters, so that threats are diminished and monk seal populations and critical habitat nation-wide are not lost.

A recent map showing the geographic distribution of monk seal sightings throughout the Hellenic coasts strikingly demonstrates how widely distributed the species is in the area. This consideration, coupled with the knowledge that the total seal population in Greece is estimated to be of < 220 individuals, strengthens the conviction that monk seals in Greece range widely, and that their habitat is widely diffused rather than concentrated in a few hotspots. While the importance of carefully protecting such hotspots (i.e., important monk seal breeding areas) must not be underestimated, it is equally important to act in all other areas where monk seals are known or likely to occur. In these areas monk seal conservation activities can only be performed at lower intensities than will be possible in the most important areas, however relevant actions can still be performed, also through learning from the experience acquired in breeding sites.

Such activities should include the continued monitoring of seal presence and mortality, and the enforcement of laws and enactment of all possible measures to reduce threats to monk seals (e.g., human-induced mortality with a particular emphasis to deliberate killings; disturbance, by-catch and other seal-fishery interactions; pollution; and destruction of habitat by military exercises, particularly within relevant distance from known breeding sites). A general, much-needed improvement and rationalisation of fisheries management at the national level, ensuring the sustainability of the activities (such as it is envisaged by the Marine Strategy Framework Directive of the EU and more in detail by the "MOFI" Action Plan), can only bring substantial advantages to monk seal conservation. Overfishing and illegal fishing practices (e.g., with explosives) deriving from lack of a solid management, lack of enforcement, and insufficient regulations, which negatively affect monk seals by reducing prey availability and increasing competition (and hostility leading to direct kills), will be addressed through adequate management provisions, as part of Greece's European obligations. Lastly, a contingency plan should be in place for exceptional or unusual mortality events, and to deal with large-scale pollution disasters (e.g., oil or chemical spills). Finally, the effects of global warming (e.g., sea level rise) should be closely monitored and their actual and potential consequences to monk seal conservation (e.g., availability of breeding habitat in caves) should be assessed.

4. The Action Plan

The four objectives will be met through the implementation of a number of actions to be conducted between 2009 and 2015, listed below. The actions are also listed in a tabular form (see Section 6), which also provides a set of indicators necessary for evaluating the achievements of the Action Plan. In the case of more complex actions, these are subdivided into different components in Section 6.

4.1. Actions related to Objective 1: Monk seal conservation is established as a national priority:

1A Formulation of New Legislation - Establishment of a National Monk Seal Conservation Commission

A new national law on monk seal conservation in Greece is adopted, inspired by the goal, objectives and actions contained in the "New Strategy". In particular, the new law should provide for the establishment of a *National Monk Seal Conservation Commission* (MSCC) having the mandate of monitoring and coordinating monk seal conservation efforts in Greece and of facilitating its integration into the wider national marine conservation policy. Terms of Reference for the MSCC are to be included in the law's text detailing roles, composition, functioning procedures, and funding. Monk seal conservation efforts are integrated with similar international efforts by other marine conservation and management instruments and organisations (e.g., UNEP MAP, ACCOBAMS, EU Bird and Habitat Directives, General Fisheries Commission for the Mediterranean), thereby framing monk seal conservation within the broader concern of conserving Mediterranean marine ecosystems. Most importantly, monk seal conservation is fully integrated within the national Marine Conservation Strategy which Greece will develop and implement on the bases of modalities and times defined in the EU Marine Framework Strategy Directive. Species-relevant criteria and guidelines on habitat protection, research, monitoring, rescue and rehabilitation activities are incorporated into the new legislation. Furthermore, measures for the mitigation of the seal-fisheries conflict (as proposed in the "MOFI" Action Plan) are also incorporated into the new legislation. The MSCC may propose further revisions to the existing legislation relevant to the species' conservation and recommend modifications as deemed necessary. Action 1A is a prerequisite to the implementation of most actions proposed to meet Objective 4.

1B Implementation of Nationwide Public Awareness Activities

A vigorous, coordinated programme of awareness and education campaigns is conducted at the national level in Greece by an *ad hoc* task force created by NGOs and other concerned stakeholders, in consultation with the MSCC, with the goal of providing high and widespread public visibility to the imperative need of conserving monk seals and their habitat. Specific target groups will be selected, including the general public, the schools (teachers and students), the political community and public servants, the law enforcers, and the industry connected with the use of the sea (e.g., fisheries, shipping, tourism).

1C Providing Expertise at the International Level

Greece provides expert support to monk seal conservation throughout the species' range at the international level, wherever monk seals and/or their critical suitable habitat are still present. The present Strategy and Action Plan are disseminated widely throughout other Mediterranean monk seal range states, and the Greek experience in implementing a conservation strategy for the species is shared with all the relevant bodies (e.g., the EU and international environmental conventions) with the view of advancing the species' conservation throughout its range and promoting its recovery.

4.2. Actions related to Objective 2: Knowledge of monk seal ecology and biology important for the conservation of the species is secured:

2A Creation of Nation-wide Monk Seal Breeding Sites Inventory

A nation-wide inventory of monk seal breeding sites (e.g., caves) is completed, and all locations where monk seal breeding is known to currently occur are identified, so that adequate conservation action and monitoring can be extended to the entirety of the species' remaining breeding habitat in Greece.

2B Monitor Monk Seal Status

Regular population assessments and monitoring, essential for evaluating the status of the population and determining the efficiency of recovery actions, is conducted throughout the species range. This will be done by improving capabilities of generating nationwide population estimates and trends through field surveys techniques, remote monitoring of breeding caves, the continued implementation of the national information network "RINT" (including the creation of local networks within the main monk seal breeding areas), and will include monitoring of impacts from new activities which may be implemented in the future, and from a changing environment (i.e. climate change), as they develop.

2C Study Key Aspects of Monk Seal Ecology and Biology

Assemble relevant scientific data on monk seal ecology and biology, such as dispersion, home range, population structure, genetic variability, reproductive biology, feeding ecology and behaviour, complementing existing data with original research, as needed for conservation purposes.

2D Study Key Socio-economic Aspects of Monk Seal Conservation

Investigate socio-economic aspects of monk seal conservation, including studies of the local attitudes towards monk seals, to describe the baseline on public perception (values) on monk seals, and studies quantifying economic advantages and negative impacts deriving from monk seal presence in an area.

4.3. Actions related to Objective 3: Areas containing monk seal critical breeding habitat in Greece are identified, legally protected and organised into a functional network of protected areas in which monk seal numbers are stable or increasing:

3A Designation of Monk Seal Breeding Areas as Protected

All areas containing monk seal actively used breeding habitat (see 2A) are formally designated protected areas, are included in the *Natura 2000* Network, and considered in the national strategy developed and implemented within the framework of the EU Marine Framework Strategy Directive.

3B Effectively Manage Monk Seal Protected Areas

Formally established monk seal protected areas are effectively managed. This will include providing all areas with a management body, endowed with sufficient powers as well as means and human resources to prevent and/or control activities likely to be contrary to the aims of the protected area. Specific actions include:

(1) Appropriate zoning of MPA is established and enforced, with strict no-take zones separated from zones where regulated fishing can occur, providing, insofar as it is possible, privileges to local fishermen.

(2) Conservation measures are established within MPAs, and are demonstrably effective, to manage human activities affecting survivorship, habitat loss and prey depletion of monk seals. In

particular, interactions with fishing activities are managed, illegal fishing activities are combated, and measures are in place to control entanglement and other sources of human-caused mortality or stress (e.g., direct damage, habitat destruction and prey depletion deriving from overfishing; dynamite fishing; disturbance to seals in their critical habitat; habitat degradation through coastal development, pollution, and climate change).

(3) Creative experimental mechanisms (e.g., insurance against gear damages, tax breaks to fishermen operating in monk seal MPAs, incentives of various nature to fishing communities related to the conservation status of monk seals) are introduced to mitigate fishermen's hostility towards monk seals deriving from damages caused by the seals to their activities.

(4) Considering that effectiveness of measures addressing threats will be significantly improved if a local consensus-based conservation climate is achieved, awareness and education campaigns are conducted in each of the MPAs, targeting the local general public, the fishing community, the school system (teachers and students), the local authorities, tourist operators, the clergy and other stakeholders. Awareness and education campaigns are also conducted targeting tourists in locations in or near monk seal MPAs. Attitudes should be measured at the beginning and at end of the campaign (e.g., Willingness To Pay) to assess effectiveness of actions.

(5) Create a model for local participatory mechanisms in communities affected by monk seal protected areas, by selecting at least one of these MPAs, deemed to be responsive to such programme, to be used as a natural laboratory of monk seal-human coexistence. The idea is to create a clearly advantageous "package" for the selected community, which however may be implemented only if no dead seals are found in the area. Actions will include the active involvement and participation of local people in conservation activities (e.g., RINT, monitoring, rescue, care and release, guarding and enforcement, awareness actions); awareness of the economic advantages for areas hosting monk seal populations (e.g., as tourist attraction, see 3B.4; fishing facilitation, see 3B.1); incentive to changes in fishing activities with gear that is less dangerous to seals; promoting reduction of fishing effort through the creation of economically more attractive and environmentally friendly jobs (e.g., responsible ecotourism). Utilising such tools, local stewardship is created, through the formation of local conservation leaders/advocates, who enjoy the trust of the local fishermen and facilitate cultural transition to a more benevolent approach to monk seals.

(6) Compliance monitoring is regularly and adequately performed, to ensure that MPAs regulations (including combating illegal and destructive activities such as dynamite fishing and nocturnal spear gun fishing) are effectively enforced.

(7) Monitoring of monk seal population status is regularly performed within MPAs through the development of local branches of RINT. In addition, monitoring is performed of seal population numbers and trends on a regular basis (including cave monitoring) possibly through a cooperative effort between seal specialists and MPA staff, using state-of-the-art techniques to ensure minimal-to-no invasiveness into the seal habitat. Catalogues of seals based on artificially or naturally tagged animals are created for each MPA and are regularly maintained. Mortality events are investigated thoroughly whenever they occur.

(8) Environmental monitoring is regularly performed to provide the necessary data to assess the status of local fish stocks, of marine pollution and of habitat degradation and to be used in the development of measures to improve the status of the environment of the MPAs.

(9) MPA-specific contingency plans are prepared and implemented to respond to oil spills, mass monk seal mortality events and other disasters.

3C Establish a Functional Network of Monk Seal MPAs

All monk seal protected areas are linked together into a functional network of MPAs. MPA managers and main stakeholders are invited to meet regularly to exchange views and share experiences. Inventoried key areas are linked together into a "national network" of monk seal

conservation areas. Monk seal catalogues from different areas (see 3B.7) are compared to detect matching of individuals and understand patterns of dispersal/exchange among areas. Local stakeholders are encouraged to meet regularly at the national level to exchange information and to communicate amongst them. Thereby a national community of monk seal conservation practitioners is developed under the coordination of the MSCC.

4.4. Actions related to Objective 4: Monk seal conservation measures are legally adopted and effectively implemented throughout national waters, so that threats are diminished and monk seal populations and critical habitat nation-wide are not lost:

4A Implement Nation-wide Monk Seal Conservation Measures

Ensure that conservation measures provided for by revised national legislation (see 1A) are implemented to address and mitigate threats (disturbance, pollution, destruction of habitat) through the regulation of potentially harmful human activities, such as shipping and military exercises, particularly within relevant distance from known breeding sites. In addition, all monk seal breeding caves listed in the national inventory (see 2A) are formally declared no-entry protected areas.

4B Mitigate Monk Seal Human-induced Mortality

Overall human-induced seal mortality is mitigated by addressing negative fishery interactions through the introduction of creative compensation schemes (experimented in 3B.3), awareness campaigns targeting fishing communities, environmental education targeting the fishermen's children, and enforcement of existing fisheries legislation. In particular:

- (1) "MOFI"'s Action Plan to mitigate seal-fishery interactions is implemented;
- (2) No-take fishing zones (NTZ) are created specifically to protect fish stocks from overexploitation and to replenish stocks to support fisheries and ecosystem health; and
- (3) Support is provided to aquaculture facilities to deal with monk seal depredation, through methods that will not harm the seals.

4C Mitigate Human-induced Degradation of Monk Seal Habitat

Overall human-induced habitat degradation is mitigated through stricter environmental standards for industrial and agricultural activities affecting runoff and discharge in the relevant catchment areas.

4D Continuation of Operation of RINT

The National Information Network ("RINT"), as well as rescue and rehabilitation activities continue to operate on a nation-wide basis and are strengthened.

4E Develop National Contingency Plan for Monk Seal Emergencies

A national contingency plan to deal with exceptional or unusual monk seal mortality events is established and is readily operational.

5. Revision of the Strategy

A mid-term assessment of the implementation of the Strategy and Action Plan should be performed in 2012, to assess up-to-date attainment of objectives within the Strategy's timeframe and to identify, if needed, moderate adjustments. A comprehensive review of the Strategy's accomplishments and failures, based on the indicators presented in the Implementation Table, with

a consideration for potential actions to be taken beyond 2015, will be conducted in 2015. If objectives are met, a future strategy might shift focus on locations outside critical breeding habitat to enhance the opportunity for monk seals to repopulate their former range.



6. Implementation Schedule

Objective 1. Monk seal conservation is established as a national priority			
action	sub-action	indicators of achievement	notes
1A Formulation of New Legislation - Establishment of National Monk Seal Conservation Commission	1A.1. A <i>Monk Seal Conservation Commission</i> (MSCC) is established with the mandate to monitor and coordinate monk seal conservation efforts.	<ul style="list-style-type: none"> • MSCC officially established • MSCC Terms of Reference officially adopted 	
	1A.2. Monk seal conservation efforts integrated with similar efforts by other national and international marine conservation and management instruments and organisations	<ul style="list-style-type: none"> • Monk seal conservation integrated within the relevant national policies 	
	1A.3. Monk seal conservation is fully integrated within the national marine conservation strategy which Greece will develop and implement on the basis of the EU Marine Framework Strategy Directive.	<ul style="list-style-type: none"> • Monk seal conservation included within national Marine Conservation Strategy legislation 	
	1A.4. Species-relevant criteria and guidelines on habitat protection, research, monitoring, rescue and rehabilitation activities are legislatively established.	<ul style="list-style-type: none"> • Criteria and guidelines adopted by MSCC • Criteria and guidelines incorporated in legislation 	
	1A.5. Measures for the mitigation of seal-fisheries conflicts (as proposed in the "MOFI" Action Plan) legislatively established.	<ul style="list-style-type: none"> • "MOFI" Action Plan is adopted by State authorities • "MOFI" Action Plan policy measures legislated 	
	1A.6. The MSCC revises the existing legislation relevant to monk seal conservation and recommends modifications as deemed necessary.	<ul style="list-style-type: none"> • Proposed amendments by MSCC adopted and legislated 	
1B Implementation of Nationwide Public Awareness Activities	1B.1. A coordinated programme of awareness and education campaigns at the national level is designed in consultation with the MSCC.	<ul style="list-style-type: none"> • Design of awareness and education campaigns completed with clear target groups, goals and timetable • MSCC, key NGOs and stakeholders involved in the campaigns' design 	
	1B.2. Specific campaigns for each target group, including the general public, the schools (teachers and students), the political community and public servants, the law enforcers, and the industry connected with the use of the sea (e.g., fisheries, shipping, tourism) are implemented at the national level.	<ul style="list-style-type: none"> • Number of key target groups involved in the campaigns • Awareness on the need for monk seal conservation increased in all target groups • Monk seal conservation is established nationally as priority 	
	1B.3. Evaluation of the campaigns' effectiveness at regular intervals	<ul style="list-style-type: none"> • Develop target group specific indexes of campaigns' success • Evaluation of campaigns conducted regularly • Campaigns goals and timetable adjusted appropriately based on evaluations 	
1C Providing Expertise at the International Level	1C.1. Greece provides expert support to monk seal conservation throughout the species' range at the international level.	<ul style="list-style-type: none"> • Participation in international conferences • Provision of consultancy to other countries 	
	1C.2. Conservation Strategy and Action Plan disseminated widely throughout other Mediterranean monk seal range states.	Number of countries/bodies Strategy disseminated to	

Objective 2. Knowledge of monk seal ecology and biology important for the conservation of the species is secured			
action	sub-action	indicators of achievement	notes
2A Creation of Nation-wide Monk Seal Breeding Sites Inventory	2A.1. A nation-wide survey of monk seal breeding sites is completed,	<ul style="list-style-type: none"> Percent of coastline surveyed for monk seal breeding sites. 	
	2A.2. All locations where monk seal breeding is known to currently occur are identified and mapped . Spatial modelling methods are applied to develop inventory.	<ul style="list-style-type: none"> Inventory of monk seal breeding caves completed. 	
2B Monitor Monk Seal Status	2B.1. Establish regular monitoring and population assessments within monk seal MPAs,	<ul style="list-style-type: none"> Number of monk seal MPAs with permanent monitoring programs operational. Reports of monitoring results regularly published Population monitoring completed over entire country every 3 years (i.e 2012, 2015). 	
	2B.2. Improve capabilities of generating nationwide population estimates and trends, and introduce and adopt standardised or compatible sighting and population assessment method throughout the country.	<ul style="list-style-type: none"> Variability of population estimates significantly decreased between 2009 and 2015. 	
	2B.3. Continue and expand remote monitoring of breeding caves, to extract highly conservation-relevant data on pup production and survival.	<ul style="list-style-type: none"> Permanent remote monitoring installations increased. Reports of monitoring results regularly published 	Activity must be done with the greatest care to avoid any element of invasiveness and negative impact on seals.
	2B.4. Continue and improve nationwide operation of RINT, and create local networks within monk seal MPAs.	<ul style="list-style-type: none"> Regular monitoring programmes in place. <ul style="list-style-type: none"> Reports of RINT results regularly published. Nation-wide, effort-corrected monk seal distribution and abundance map completed by 2015. 	This action to be coordinated and mutually reinforced with similar actions detailed under Objectives 3 and 4.
	2B.5. Monitor impact of new activities which may be implemented in the future (e.g., fisheries, transportation) and environmental changes as they develop, in cooperation with relevant Greek and international marine science institutions and organisations (e.g., FRI, HCMR, CIESM).	<ul style="list-style-type: none"> Regular monitoring programmes in place. Reports of monitoring results regularly published. 	Elements to be monitored include, amongst a) future activities: new fisheries, shipping; b) environmental changes: sea temperature changes, sea level changes and how these may affect breeding caves, changes in fish species assemblages through increases of alien immigrants.
2C Study Key Aspects of Monk Seal Ecology and Biology	2C.1. Investigate dispersion and individual home ranges.	<ul style="list-style-type: none"> All released rehabilitated seals are equipped with telemetry devices Utilise Photo-ID catalogue within Greece and with neighbouring countries. Studies conducted and publications produced. 	
	2C.2. Investigate aspects of monk seal population structure and genetic variability relevant to conservation.	<ul style="list-style-type: none"> Tissue samples for genetic analyses collected in all occasions, and stored in monk seal tissue bank. Genetic analyses performed across widest geographical range, within and outside Greece, to describe population and genetic structure. Studies conducted and publications produced. 	
	2C.3. Investigate aspects of monk seal reproductive biology relevant to conservation.	<ul style="list-style-type: none"> Tissue samples for reproductive biology analyses collected in all occasions and stored in monk seal tissue bank. Studies conducted and publications produced. 	

Objective 2. Knowledge of monk seal ecology and biology important for the conservation of the species is secured (continued)			
action	sub-action	indicators of achievement	notes
2C Study Key Aspects of Monk Seal Ecology and Biology	2C.4. Investigate monk seal feeding ecology and trophodynamics relevant to conservation	<ul style="list-style-type: none"> Feeding habits and diet of monk seals in Greece, and their temporal/spatial variability, thoroughly investigated through stomach content analyses, stable isotopes analyses and through behavioural and anecdotal observations.. Studies conducted and publications produced. 	
	2C.5. Investigate monk seal behaviour relevant to conservation.	<ul style="list-style-type: none"> Utilise remote monitoring data Studies conducted and publications produced. 	
2D Study Key Socio-economic Aspects of Monk Seal Conservation	2D.1. Investigate the local attitudes towards monk seals, to describe the baseline on public perception (values) on monk seals,	<ul style="list-style-type: none"> Establish variates to quantify local attitudes to compare across space and time. Studies conducted and publications produced. 	
	2D.2. Investigate and quantify economic advantages and negative impacts deriving from monk seal presence in an area.	<ul style="list-style-type: none"> Studies conducted and publications produced. 	



Objective 3. Areas containing monk seal critical breeding habitat in Greece are identified, legally protected and organised into a functional network of protected areas in which monk seal numbers are stable or increasing			
action	sub-action	indicators of achievement	notes
3A Declaration of Monk Seal Breeding Areas as Protected	3A.1. All areas containing monk seal actively used breeding habitat are formally declared protected areas,	<ul style="list-style-type: none"> Number of monk seal key breeding areas established as MPAs 	
	3A.2. All areas containing monk seal actively used breeding habitat are included in the <i>Natura 2000</i> Network and Strategy for the EU Marine Framework Strategy Directive.	<ul style="list-style-type: none"> Number of monk seal key breeding areas included in <i>Natura 2000</i> Network 	
3B Effectively Manage Monk Seal Protected Areas	3B.1. Establish Management Bodies, with sufficient powers, as well as, means and human resources for all monk seal protected areas .	<ul style="list-style-type: none"> Number of monk seal MPAs with established Management Bodies Number of Management Bodies with sufficient recourses. 	
	3B.2. Appropriate zoning of MPAs is established.	<ul style="list-style-type: none"> Number of MPAs with detail zoning system legislatively established 	
3B Effectively Manage Monk Seal Protected Areas	3B.3. Conservation measures are established within MPAs, and are demonstrably effective, to manage human activities	<ul style="list-style-type: none"> Number of MPAs with adopted management plans Number of management plans actively implemented Periodic assessments of management plans' effectiveness 	
	3B.4. Introduce creative experimental mechanisms to mitigate damages to fishermen caused by monk seals.	<ul style="list-style-type: none"> Number of MPAs with measures to mitigate seal-fishery conflict Decrease of fishermen's negative attitude within MPAs Decrease of monk seal deliberate killings within MPAs 	See Zabel A., Holm-Müller K. 2008. Conservation performance payments for carnivore conservation in Sweden. Conservation Biology 22(2):247–251. DOI: 10.1111/j.1523-1739.2008.00898.x
	3B.5. Awareness and education campaigns are conducted in each of the MPAs, targeting key groups and stakeholders.	<ul style="list-style-type: none"> Number of key stakeholders within MPAs targeted by awareness campaigns Increase community involvement in monk seal conservation and MPA protection Awareness index (eg., willingness-to-pay, WTP) significantly increased between 2009 and 2015 within MPAs Decrease of monk seal deliberate killings within MPAs WTP of tourists significantly increased between 2009 and 2015. 	
	3B.6. Develop one MPA as a model system of monk seal–human coexistence, where a clearly advantageous “package” of measures for the selected community is designed	<ul style="list-style-type: none"> Increase community involvement in monk seal conservation and MPA protection Decrease of fishermen's negative attitude within MPAs Benefits for local communities generated within MPAs. 	

Objective 3. Areas containing monk seal critical breeding habitat in Greece are identified, legally protected and organised into a functional network of protected areas in which monk seal numbers are stable or increasing (continued)			
action	sub-action	indicators of achievement	notes
3B Effectively Manage Monk Seal Protected Areas	3B.7. MPAs regulations are consistently and adequately enforced.	<ul style="list-style-type: none"> Number of MPAs with established guarding system Decrease of illegal activities within MPAs. 	
	3B.8. Establish permanent monk seal population monitoring mechanisms within MPAs, through the development of local branches of RINT, cave monitoring and mortality events investigation.	<ul style="list-style-type: none"> Number of MPAs with monk seal monitoring system established and operational Number of MPAs with local RINT branches operational Status of monk seal populations within MPAs regularly reported 	
	3B.9. Establish regular environmental monitoring mechanisms to assess the status of local fish stocks, of marine pollution and of habitat degradation.	<ul style="list-style-type: none"> Number of MPAs with environmental monitoring system established and operational Status of key environmental parameters within MPAs regularly reported 	
	3B.10. MPA-specific contingency plans are prepared and implemented to respond to oil spills, mass monk seal mortality events and other disasters.	<ul style="list-style-type: none"> Number of MPAs with adopted contingency plans Number of emergency cases where contingency plans were utilised 	
3C Establish a Functional Network of Monk Seal MPAs	3C.1. All monk seal protected areas are linked together into a functional network of MPAs.	<ul style="list-style-type: none"> Monk seal MPAs cooperate in terms of planning, actions, and personnel Status of monk seals within MPAs improves 	
	3C.2. Under the coordination of the MSCC, monk seal MPA managers develop relevant plans of action for the species for each MPA	<ul style="list-style-type: none"> Monk seal action plans within MPAs developed and approved by MSCC 	
	3C.3. Under the coordination of the MSCC, MPA managers and local stakeholders meet regularly to exchange views and share experiences	<ul style="list-style-type: none"> A national community of monk seal conservation practitioners is developed under the coordination of the MSCC. 	

Objective 4. Monk seal conservation measures are legally adopted and effectively implemented throughout national waters, so that threats are diminished and monk seal populations and critical habitat nation-wide are not lost			
action	sub-action	indicators of achievement	notes
4A Implement Nation-wide Monk Seal Conservation Measures	4A.1. All monk seal breeding caves listed in the national inventory (see 2A.1) are formally declared no-entry protected areas.	<ul style="list-style-type: none"> Number of breeding caves declared as no-entry areas 	
	4A.2. Conservation measures to address and mitigate threats and regulate human activities are implemented to protect monk seal habitat outside of MPAs	<ul style="list-style-type: none"> Key threats addressed by nationwide conservation measures Number of areas where additional conservation measures are implemented 	Conservation activities are applied to a less intensive scale to monk seal habitat outside of MPAs
4B Mitigate Monk Seal Human-induced Mortality	4B.1. MOFI's Action Plan is implemented.	<ul style="list-style-type: none"> MOFI Action Plan adopted by relevant authorities Number of MOFI Action Plan proposals implemented 	
	4B.2. No Take fishing zones (NTZ) are created to protect fish stocks.	<ul style="list-style-type: none"> Number of NTZ established Status of fish stocks improves within NTZ and surrounding areas 	Specifically provided for in: European Commission. 2003. Council Regulation concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean Sea and amending Regulations (EC) No 2847/93 and (EC) No 973/2001. Report of the Commission of the European Communities. 39 p.
	4B.3. Support aquaculture facilities to deal with monk seal depredation	<ul style="list-style-type: none"> Number of aquaculture facilities adoption proper anti-predation measures 	Acoustic deterrents to keep monk seals away from aquaculture nets are illegal.
4C Mitigate Human-induced Degradation of Monk Seal Habitat	4C.1. Strict environmental standards for industrial and agricultural activities affecting monk seal habitat are established	<ul style="list-style-type: none"> Status of monk seal habitat is improved in terms of pollution 	
4D Continuation of Operation of RINT	4D.1. The National Rescue and Information Network ("RINT") continues to operate on a nation-wide basis and is strengthened.	<ul style="list-style-type: none"> RINT membership improves in size and in communication quality/frequency 	
	4D.1. Rescue and rehabilitation activities continue on a nation-wide basis both in situ and in a central state-of-the-art Rehabilitation facility.	<ul style="list-style-type: none"> Rescue operations are readily available throughout Time of rescue response improves Percentage of animals rescued and released remains high and if possible improves New Rehabilitation facility built and operational 	This action and similar area-specific actions (Objective 3) are coordinated and mutually reinforced.
4E Develop National Contingency Plan for Monk Seal Emergencies	4E.1. A national contingency plan to deal with exceptional or unusual monk seal mortality events is established and is readily operational.	<ul style="list-style-type: none"> National contingency plan adopted by relevant state authorities Contingency plan readily operational in terms of resources (i.e. infrastructure, trained personnel, financing) Number of times contingency plan used in such cases 	This action and similar area-specific actions (Objective 3) are coordinated and mutually reinforced.



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8. Papers, reports, presentations, abstracts and miscellaneous items

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10. Appendix – List of sensitive areas proposed by MOm in 1999 to be included in the National Contingency Plan against oil spills in view of the presence of Mediterranean monk seals

A. AREAS OF NATIONAL IMPORTANCE

1. National Marine Park of Alonnisos, Northern Sporades
2. Milos-Kimolos-Polyaigos island complex in Cyclades
3. Northern Kaprathos-Saria-Astakida island complex in Dodecanese
4. West-northwest coast of Zakynthos island in the Ionian
5. West and south of Kithira island in the Ionian
6. Kefalonia and Ithaca islands in the Ionian

B. AREAS WHERE BREEDING HAS BEEN RECORDED

7. Skopelos island in the Sporades
8. North coast of Evia
9. West coast of Pilion
10. West coast of Lesbos island in the Eastern Aegean
11. Agios Efstratios island in the Eastern Aegean
12. Psara island in the Eastern Aegean
13. North coast of Ikaria island in the Eastern Aegean
14. Nisiros island in the Dodecanese
15. Tilos island in the Dodecanese
16. West coast of Corfu island in the Ionian
17. Dia island in Crete

C. AREAS OF INTEREST FOR THE SPECIES (In these areas, the presence of monk seal habitat has been recorded)

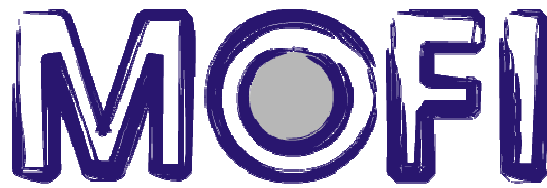
18. West coast of Simi island in the Dodecanese
19. Northwest coast of Rhodes island in the Dodecanese
20. Koufonisia island complex in the Cyclades
21. North-west coast of Iraklia island in the Cyclades
22. Folegandros island in the Cyclades
23. Sikinos island in the Cyclades
24. West coast of Santorini island in the Cyclades
25. North coast of Anafi island in the Cyclades
26. Antiparos and neighboring islets in the Cyclades
27. Andros island in the Cyclades
28. Tinos island in the Cyclades
29. West coast of Mykonos island and Tragonisi islet in the Cyclades
30. Donousa island in the Cyclades
31. Amorgos island in the Cyclades
32. Keros island in the Cyclades
33. North and East coast of Naxos island and Makares islets in the Cyclades
34. West and South coast of Lefkada island in the Ionian

D. AREAS OF POTENTIAL INTEREST FOR THE SPECIES (In these areas, the presence of monk seals has been recorded through the National Rescue and Information Network)

35. Mount Athos peninsula in Chalkidiki
36. Sithonia peninsula in Chalkidiki
37. Samos island in the Eastern Aegean
38. Chios island in the Eastern Aegean
39. Fourni island in the Eastern Aegean
40. Arkioi and Leipsi islands in the Eastern Aegean
41. Patmos island in the Eastern Aegean
42. Kastelorizo island in the Eastern Aegean
43. Dionisades islets in Crete



Monk Seal & Fisheries



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