

# Ionian Archipelago Important Marine Mammal Area - IMMA

## Description

The Ionian Sea, located west of continental Hellas and the Hellenic Trench, which surrounds the southernmost Hellenic territories in the south, hosts the deepest basins of the Mediterranean Sea. Two different parts may be recognised: the northern and the southern one, with the boundary between them being marked by the Kefallonia strike-slip fault. The northern part can be seen as the southward prolongation of the Adriatic Sea. The northern Ionian Sea is characterised by an extensive shelf, with Corfu Island being part of it, connected to a relatively flat basin by a steep slope. The sea-floor morphology changes dramatically in the southern part of the Ionian Sea and coincides with the high seismicity of the region. Normal active faults are responsible for the formation of deep gulfs, like the Messiniakos and Lakonikos gulfs and valleys. The regional tectonics and fault movements are controlling the sedimentation in these areas. Turbiditic and gravity driven deposits form the bulk sedimentary infill. Deeply eroded submarine canyons dissect the shelf and the slope off the Ionian islands and the Peloponnisos and terminate down-slope in small, deep, isolated basins at depths over 4,000 m. Note that the deepest basin (Vavilov Deep) in the Mediterranean Sea is located in this region, only 30 miles off the SW coast of the Peloponnisos and is over 5,100 m deep (SoHelMe, 2005).

The Ionian Archipelago IMMA includes the marine areas surrounding the islands of Ionian Sea, Othonoi, Ereikousa, Mathraki, Corfu, Paxoi, Antipaxoi, Lefkada, Cephalonia, Ithaki, Zakynthos, their satellite islets, as well the marine area with small islands and islets included between their eastern coasts and until the coastline of mainland Greece. The Inner Ionian Sea Archipelago, which includes



## Area Size

9,606 km<sup>2</sup>

## Qualifying Species and Criteria

Common dolphin - *Delphinus delphis*  
Criterion A; B (i); C (i, ii)

Mediterranean monk seal -  
*Monachus monachus*  
Criterion A; C (i)

## Marine Mammal Diversity

[*Balaenoptera physalus*,  
*Ziphius cavirostris*]

## Summary

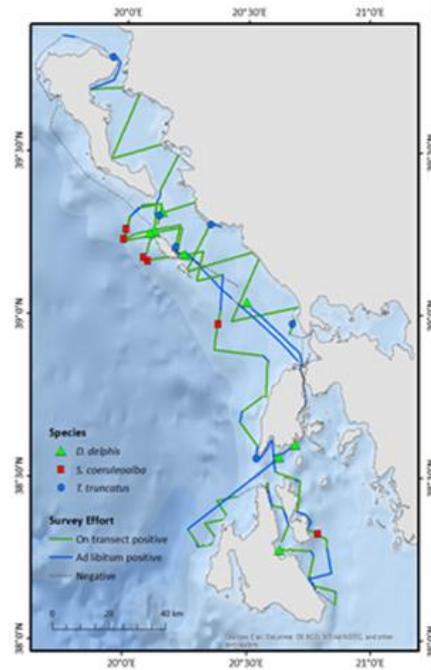
Within the Ionian Archipelago, Endangered Mediterranean common dolphins (*Delphinus delphis*) suffered a dramatic decline between 1995 and 2007. Monitoring done in subsequent years, together with numerous reports of opportunistic sightings provided by collaborating partners and researchers, has shown that they likely roam across a much wider area around the Archipelago. This area also features one of the most important areas globally for the Endangered Mediterranean monk seal (*Monachus monachus*), with an estimated 5.7% to 9.2% of the global population. Breeding habitats used for pupping have been well documented in the area.

the coasts of islands and islets delimited geographically by the East site of Lefkada, Ithaki and Kefalonia and continental Greece, covering approximately 866 km<sup>2</sup>, was included by the Greek Ministry of the Environment Physical Planning and Public Works in the Natura 2000 network as a 'Site of Community Importance/ Special Area of Conservation – GR2220003' under the 92/43/EEC Habitats Directive. Overall, the Ionian Archipelago IMMA has its northern and southern limits delimited by the contour of 200 metres depth. The area is within the national jurisdiction of Greece, being within the boundaries of the 6 Nautical miles of territorial waters.

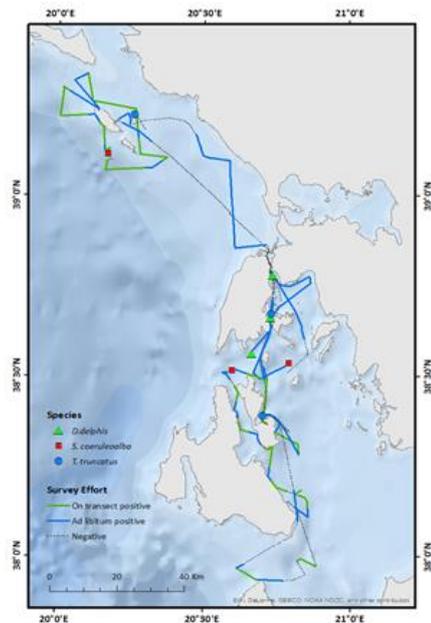
Common dolphins, formerly abundant in the Inner Ionian Sea Archipelago, suffered a precipitous decline from approximately 150 to 15 animals between 1995 and 2007 which, was convincingly linked to overfishing of their main epipelagic prey. Most of the fish species caught in the Archipelago are commercially important and their stocks are characterized by declining landings in recent years. Bottlenose dolphins, also present in the area, are mostly transient although a few animals, about one quarter of those photo identified, display high levels of residency and stable trends.

More recent surveys conducted in the Inner Ionian Sea Archipelago between 2008 and 2016 have recorded the sporadic presence of common dolphin groups of up to 40 individuals. In addition, 40+ opportunistic sightings have been reported through the Ionian Dolphin Project sightings network set up in 2012 (Gonzalvo, Tethys Research Institute, unpublished data). A couple of 2-weeks boat surveys conducted in October 2015 and 2016, respectively, provided evidence about the formerly highly-resident common dolphins having effectively dispersed and roaming over a wider area, still moving occasionally into the Inner Ionian Sea Archipelago (see Annex 1 with detail on research effort of these two surveys). Genetic evidence indicated a relatively high degree of differentiation among common dolphins in the Mediterranean and showed that common dolphins in the eastern part of the basin, including the Ionian Sea, were largely isolated

from the western Mediterranean population. In addition to common dolphins *Delphinus delphis* the Archipelago offers critical habitat to species included in Annex II to the Habitats Directive, namely the bottlenose dolphin and the Mediterranean monk seal *Monachus monachus*.



Survey effort and sightings in waters adjacent to the Inner Ionian Sea Archipelago in Sept-Oct 2015 (Gonzalvo, 2016)



Survey effort and sightings in waters adjacent to the Inner Ionian Sea Archipelago in Oct 2016 (Gonzalvo, 2016)

*Monachus monachus* (Hermann, 1779). The Mediterranean Monk Seal is listed as Endangered in the global IUCN Red List of Threatened species (Karamanlidis and Dendrinos, 2015). Taxonomically it belongs to the order Pinnipedia, Family Phocidae (Subfamily Monachinae), the sole representative of its genus (Scheel et al., 2014). Mean length of adults is 2.4 m for males and 2.0 to 2.4 m for females; mean weight is 315 and 300 kg for adult males and females respectively. Monk seal pups measure approximately 1 m, weigh 15-18 kg at birth and reach sexual maturity between 5 and 6 years, although some females may mature as early as 3 or 4 years. The species is still widely distributed throughout coastal and insular Greece; important sub-populations can be found in the Aegean, mainly in Northern Sporades, Kimolos, Gyaros and Karpathos, and Ionian Seas mainly in Zakynthos and Cephalonia. The minimum population size estimate for Greece is 179 adult individuals, which represents 39.77% to 51.14% of the world's total population size estimate (Legakis and Maragou, 2009). Major threats to the species are a) habitat deterioration and loss by human coastal development, b) deliberate killing and accidental entanglement in fishing gear, c) decreased food availability due to overfishing, d) marine pollution and e) stochastic events, such as disease outbreaks. Conservation measures for the species focus on the establishment of marine protected areas, rescue and rehabilitation of orphaned or injured seals, environmental education and public awareness. The species is strictly protected under Greek law, European Directives and International Conventions.

## Criterion A - Species or Population Vulnerability

Once one of the most abundant cetacean species in the Mediterranean Sea, common dolphins *Delphinus delphis* have declined throughout the region since the 1960s. The Mediterranean subpopulation of common dolphin is classified as Endangered in the IUCN Red List of Threatened Species. The species is also listed in Appendix I and II of the Convention on the Conservation of Migratory

Species of Wild Animals (CMS), in Appendix II (Strictly Protected Fauna Species) of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), and in Annex IV of the EU Habitats Directive (Council Directive 92/43/EEC).

Ecosystem model for the Inner Ionian Sea Archipelago, formerly a hotspot for common dolphins in the Mediterranean Sea, the effect of increasing fishing effort on common dolphins, its prey and on marine biodiversity was investigated. Results showed that local fisheries have negatively impacted the marine biodiversity of the ecosystem causing sharp declines of common dolphins and major fish stocks and weakening the robustness of the marine food web.

The Mediterranean monk seal *Monachus monachus* is a pinniped assessed as Endangered [EN C2a(i)] in the IUCN Red List of Threatened Species (Karamanlidis, and Dendrinos, 2015). The species is present with a resident breeding population in the area (Panou, 2009; Gonzalvo, 2015; Legakis and Maragou, 2009). Marchessaux and Duguy, in 1977, provided a population estimate between 30 and 40 individuals for the Ionian islands. However, more recent studies (Panou, 1993, 2009) provide a higher population estimate around 37 to 60 individuals in the IMMA area. The area including the IMMA has been assessed on its significance by Archipelagos since the early '90s (Panou, 1993, 2009). Surveys have been carried out on mapping and assessing the Mediterranean monk seal shelter/marine caves that constitute the main terrestrial habitat of the species, in terms of suitability as a breeding areas, both by Archipelagos (Panou, 1993, 2009) and MOM (Legakis and Maragou, 2009). MOM has been collecting information for sightings in the area through the Rescue and Information Network, a nationwide system for recording monk seal encounters by non-experts established in 1992 (Adamantopoulou, 1999). The minimum population estimate is between 33-60 animals including pups in the IMMA area, according to Panou, 2009, which represents 5.7% - 9.2% of the global

population, based on Legakis and Maragou, 2009.

## **Criterion B: Distribution and Abundance**

### **Sub-criterion Bi: Small and Resident Populations**

There is strong evidence of common dolphins being regularly present, showing various degrees of site-fidelity, within the limits of the proposed IMMA. Photo-identification effort conducted in the Inner Ionian Sea Archipelago between 1995-2015 resulted in 205 photo-identified common dolphins. Of those, 69 individuals were seen only once. From the remaining 136 dolphins, 64 showed a relatively strong site-fidelity until 2003 not to be seen again in the area since then. Eleven individuals were newly identified during the last decade. Only 61 common dolphins that were regularly identified throughout the period 1995-2003 were also occasionally identified in the Inner Ionian Sea Archipelago in subsequent years. The last two surveys conducted beyond the Inner Ionian Sea Archipelago have resulted in more than 20 recaptures of dolphins firstly identified in the Archipelago and a few dozens of new individuals not previously known.

## **Criterion C: Key Life Cycle Activities**

### **Sub-criterion Ci: Reproductive Areas**

Presence of offspring has been regularly observed in the common dolphin groups. 25+ years of photo-identification effort have allowed to follow the life cycle and reproductive rates and success of identifiable individuals.

The IMMA for the Ionian Archipelago is an area where breeding of the local population of Mediterranean monk seal is well observed and documented. According to recent reports (Legakis and Maragou, 2009) the Ionian islands have at least 194 resting and 2 breeding shelters recorded for the species. The area including the IMMA has been

assessed on its significance by Archipelagos since the early 90's (Panou, 1993, 2009). A pup that has been found orphaned in Cephalonia was rescued, rehabilitated and released by MOm (Joseph, 2009) in 2009.

## **Criterion C: Key Life Cycle Activities**

### **Sub-criterion Ci: Sub-criterion Cii: Feeding Areas**

During group-follows recording behavioural data collection, common dolphin groups have been frequently observed surface-feeding. A number of papers have looked at the competition for the fish resources between locally abundant common dolphins and the active fishing fleet. Fisheries management measures have been proposed not only to protect an increasingly fragile common dolphin population but also to try to benefit a significant part of the local community in this largely fisheries-dependent region.

## **Supporting Information**

*Adamantopoulou, S., Androukaki, E., Kotomatas, S. 1999. The distribution of the Mediterranean monk seal in Greece based on an information network. Contributions to the Zoogeography and Ecology of the Eastern Mediterranean Region 1(1999):399-404.*

*Bearzi, G., Agazzi, S., Gonzalvo, J., Bonizzoni, S., Costa, M., Petroselli, A., 2010. Biomass removal by dolphins and fisheries in a Mediterranean Sea coastal area: do dolphins have an ecological impact on fisheries? Aquatic Conservation: Marine and Freshwater Ecosystems n/a–n/a. doi:10.1002/aqc.1123*

*Bearzi, G., Agazzi, S., Gonzalvo, J., Costa, M., Bonizzoni, S., Politi, E., Piroddi, C., Reeves, R., 2008. Overfishing and the disappearance of short-beaked common dolphins from western Greece. Endang. Species. Res. 5, 1–12. doi:10.3354/esr00103*

*Bearzi, G., Politi, E., Agazzi, S., Azzellino, A., 2006. Prey Depletion Caused by Overfishing and the Decline of Marine Megafauna in the Eastern Ionian Sea Coastal Waters (central*

Mediterranean). *BIOLOGICAL CONSERVATION* 373–382. doi:10.1016/j.biocon.2005.08.017

Bearzi, G., Politi, E., Agazzi, S., Bruno, S., Costa, M., Bonizzoni, S., 2005. Occurrence and Present Status of Coastal Dolphins (*Delphinus delphis* and *Tursiops truncatus*) in the eastern Ionian Sea. *Aquatic Conservation: Marine and Freshwater Ecosystems* 15, 243–257.

Cebrian, D. 1998. *La foca monje (Monachus monachus Hermann 1779) en el Mediterráneo oriental (Grecia y Croacia)*. Ed. Universidad Complutense de Madrid. Madrid. 367 pp plus 2 appendices.

Cebrian, D. 2005. *Information Report on the Status of the Monk Seal in the Mediterranean*. Ed. UNEP/MAP-RAC/SPA.

Dendrinis, P., Tounta, E. and Kotomatas, S. 2000. A field method for age estimation of Mediterranean monk seal pups. *The Monachus Guardian* 3: 72-74.

Dendrinis, P., Karamanlidis, A.A., Androukaki, E., and Mcconnell, B.J. 2007a. Diving development and behavior of a rehabilitated mediterranean monk seal (*Monachus monachus*). *Marine Mammal Science* 23: 387-397.

Dendrinis, P., Karamanlidis, A.A., Kotomatas, S., Legakis, A., Tounta, E., and Matthiopoulos, J. 2007b. Pupping habitat use in the Mediterranean monk seal: a long-term study. *Marine Mammal Science* 23: 615-628.

EU. European Union. DGXI. LIFE-Nature Project. Conservation programme for the Ionian Sea region concerning habitats of species threatened with extinction (LIFE92 NAT/GR/013800). WWF Greece. 01-OCT-1992 – 01-DEC-1995.

Frantzis, A. 2009. *Cetaceans in Greece: Present status of knowledge. Initiative for the Conservation of Cetaceans in Greece, Athens, Greece, 94 pp.*

Gonzalvo, J. 2015. *Ionian Dolphin Project. Report to the Greek Ministry of Environment, Energy and Climate Change, and to Ministry*

*of Rural Development and Food on the Activities Conducted Between 1991 and 2015 in The Gulf of Ambracia and Inner Ionian Sea Archipelago, Greece. A report by the Tethys Research Institute. 77 pp.*

Gonzalvo, J. 2016. *Ionian Dolphin Project. Report to Greek Ministry of Environment, Energy and Climate Change, and to Ministry of Rural Development and Food on the Activities Conducted Between 1991 and 2016 in The Gulf of Ambracia and Inner Ionian Sea Archipelago, Greece. A report by the Tethys Research Institute. 85 pp.*

Gonzalvo, J., Costa, M. 2016. *Will There Be Any Reward for Common Dolphin Perseverance? In: Pace, D.S., Mussi, B., Vella, A. et al. 2016. Report of the 1st International Workshop “Conservation and Research Networking on Short-beaked Common Dolphin (Delphinus delphis) in the Mediterranean Sea”. Mediterranean Common Dolphin Working Group. Ischia Island, Italy, 13-15 April 2016. 44 pp. DOI: 10.13140/RG.2.1.4801.3047*

Gonzalvo, J., Moutopoulos, D.K., Bearzi, G., Stergiou, K.I., 2011. Fisheries mismanagement in a Natura 2000 area in western Greece. *Fisheries Management and Ecology* 18, 25–38. doi:10.1111/j.1365-2400.2010.00764.x  
Hermann, J. 1779. *Beschreibung der Moenchs-Robbe. Beschaeftigungen der Berlinischen Gesellschaft Naturforschender Freunde* 4: 456-509, pl. 412-413.

Joseph, E. 2009, *Nefeli’s Rehabilitation: Methods, Results, and Challenges*, <http://monachus-guardian.org/mguard25/2523infocu.htm>  
Karamanlidis, A. and Dendrinis, P. 2015. *Monachus monachus. The IUCN Red List of Threatened Species 2015: e.T13653A45227543. http://dx.doi.org/10.2305/IUCN.UK.2015-*

*Karamanlidis, A.A., Dendrinis, P., Fernandez de Larrinoa, P., Gücü, A.C., Johnson, W.M., Kirac, C.O., Pires, R., 2015. The Mediterranean monk seal Monachus monachus: status, biology, threats, and conservation priorities. Mammal Rev. 46 (2), 92–105. http://dx.doi.org/10.1111/mam.12053.*

Legakis, A. and Maragou, P. 2009. *The Red List of Endangered Animals of Greece*. Hellenic Zoological Society, Athens, 528 p.

Marchessaux, D., 1977. Will the Mediterranean monk seal survive? *Aquat. Mamm.* 5 (3), 87.

Marchessaux, D., 1989. Distribution et statut des populations du phoque moine *Monachus monachus* (Hermann, 1799). *Mammalia* 53 (4), 621–642.

Marchessaux, D. And R. Duguay. 1977. Note sur l'observation du phoque moine, *Monachus monachus*, en Grece. *Rapp. Comm. int. Mer Medit.* 24: 27-30

MOm, 1996. *Strategy for the Protection of the Mediterranean Monk Seal Monachus monachus in Greece*. Archipelagos—Marine and Coastal Management and Mom/Hellenic Society for the Study and Protection of the Monk Seal (MOm), Athens, Greece. 10 p.

Notarbartolo di Sciara, G., Adamantopoulou, S., Androukaki, E., Dendrinis, P., Karamanlidis, A.A., Paravas, V., Kotomatas, S., 2009a. *National Strategy and Action Plan for the Conservation of the Mediterranean Monk Seal in Greece, 2009–2015*. Hellenic Society for the Study and Protection of the Mediterranean Monk Seal (MOm), Athens, Greece, p. 19.

Notarbartolo di Sciara, G., Adamantopoulou, S., Androukaki, E., Dendrinis, P., Karamanlidis, A.A., Paravas, V., Kotomatas, S., 2009b. *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*. Publication prepared as part of the LIFENature Project: MOFI: Monk Seal and Fisheries: mitigating the conflict in Greek Seas, Hellenic Society for the Study and Protection of the Mediterranean Monk Seal (MOm). 71 p. Available from: <http://www.monachus-guardian.org/library/notarb09b.pdf>.

Notarbartolo di Sciara G., Kotomatas S. 2016. *Are Mediterranean monk seals, Monachus monachus, being left to save themselves from*

*extinction? In: G. Notarbartolo di Sciara, M. Podestà, B.E. Curry (Editors), Mediterranean marine mammal ecology and conservation. Advances in Marine Biology 75:361-388. <http://dx.doi.org/10.1016/bs.amb.2016.08.004>*

Panou, A., 2009. *Monk seal sightings in the central Ionian Sea: a network of fishermen for the protection of the marine resources*. Archipelagos—Environment and Development, Greece, In: Presentation at the “Who Are Our Seals?” Workshop, European Cetacean Society Annual Conference, Istanbul, Turkey, 28 February, p. 6.

Panou, A., Jacobs, J. and Panos, D. 1993. *The Endangered Mediterranean Monk Seal Monachus monachus in the Ionian Sea, Greece*. *Biological Conservation*, 64, 129-140. Piroddi, C., Bearzi, G., Christensen, V., 2011a. *Marine open cage aquaculture in the eastern Mediterranean Sea: a new trophic resource for bottlenose dolphins*. *Marine Ecology Progress Series* 440, 255–266. doi:10.3354/meps09319

Piroddi, C., Bearzi, G., Gonzalvo, J., Christensen, V., 2011. *From common to rare: The case of the Mediterranean common dolphin*. *BIOLOGICAL CONSERVATION* 144, 2490–2498. doi:10.1016/j.biocon.2011.07.003 UNEP-MAP-RAC/SPA, 2003. *Action Plan for the Management of the Mediterranean Monk Seal (Monachus monachus)*. Regional Activity Centre for Specially Protected Areas (RAC/SPA), Tunis. 12 p. Available from: <http://www.monachus-guardian.org/library/unepma87.pdf>.

Scheel, D.M., Slater, G.J., Kolokotronis, S-O., Potter, C.W., Rotstein, D.S., Tsangaras, K., Greenwood, A.D. and Helgen, K.M. 2014. *Biogeography and taxonomy of extinct and endangered monk seals illuminated by ancient DNA and skull morphology*. *ZooKeys* 409: 1-33.

SoHeIME. 2005. *State of the Hellenic Marine Environment*. E. Papathanassiou & A. Zenetos (eds) , HCMR Publ., 360 pp

UNEP-MAP-RAC/SPA, 2005. *Information report on the status of the monk seal in the Mediterranean*. In: *Seventh Meeting of the*

*National Focal Points for SPAs, Seville, 31 May–3 June. UNEP(DEC)/MED WG. 268/Inf 3. 45 p.*

*UNEP-MAP-RAC/SPA, 2006. Report of the International Conference on Monk Seal Conservation. Antalya, Turkey, 17–19 September 2006. UNEP. 69 p. Available from: [http://www.rac-spa.org/sites/default/files/doc\\_monackus/report\\_int\\_monk\\_seal\\_conf\\_antalya\\_2006.pdf](http://www.rac-spa.org/sites/default/files/doc_monackus/report_int_monk_seal_conf_antalya_2006.pdf).*

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MARINE MAMMAL PROTECTED AREAS TASK FORCE

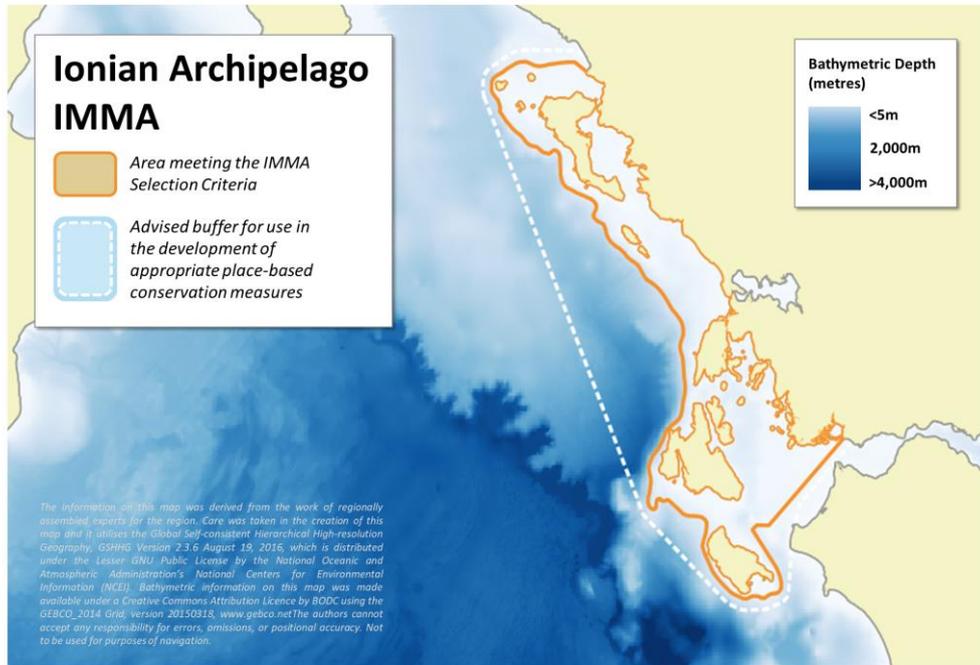


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# Annex I

## Supplementary Maps



# Annex II

## List of Primary and Secondary Species

### Primary Species – Meet the IMMA Selection Criteria

Scientific Name	Common Name of Species	Population / Subpopulation Name	IUCN Red List Status
<i>Monachus monachus</i>	Mediterranean monk seal	Global	Endangered
<i>Delphinus delphis</i>	Common dolphin	Mediterranean Subpopulation	Endangered

### Secondary Species – Do not individually meet the IMMA Selection Criteria but are present within the area

Scientific Name	Common Name of Species	Population / Subpopulation Name	IUCN Red List Status
<i>Ziphius cavirostris</i>	Cuvier's beaked whale	Mediterranean Subpopulation	Data Deficient
<i>Balaenoptera physalus</i>	Fin whale	Mediterranean Subpopulation	Vulnerable