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Progress Report 2014 on the Mediterranean Database of Cetacean Strandings

Presented by:  
University of Valencia, Spain.

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Progress Report 2014 on the Mediterranean Database of Cetacean Strandings

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**With the participation of:**

- División para la Protección del Mar. D.G. Sostenibilidad de la Costa y del Mar. Ministerio de Agricultura, Alimentación y Medio Ambiente, **Spain**
- MARE NOSTRUM. Organizatia Ecologista Neguvernamentală. **Romania**
- GREEN BALKANS NGO. Plovdiv, **Bulgaria**
- Faculty of Natural Resources and Environmental Science. FNRES, OMAR MUKHTAR UNIVERSITY. El-Beyda, **Lybia**
- Institute of Fish Resources, Varna, **Bulgaria**
- Institut National des Sciences et Technologies de la Mer – INSTM, Sfax, **Tunisia**
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- Centre de recherches Marines. CNRS: Betraun, **Lebanon**  
Centro Studi Cetacei, **Italy**
- Brema Laboratory. Simferopol, **Ukraine**
- Italian Stranding on-line Database (BDS), **Italy**
- The Mediterranean Marine Mammals Tissue Bank, **Italy**
- Department of Biology-Chemistry, Faculty of Natural science, University of Shkodra. **Albania**
- University of Oran Es Senia, **Algeria**
- Centre de Recherche sur les Mammifères Marins de la Rochelle (CRMM) ; Groupe d'Etude des Cétacés de Méditerranée, **France**
- ARION-Cetacean Rescue & Rehabilitation Research Centre, **Greece**

- Israel Marine Mammals Research and Assistance Center (IMMRAC), **Israel**
- Marine Conservation, Nature Conservation Department, Environment General Authority, **Libya**
- ACCOBAMS, **Monaco**
- "Naturalist group Guelaya", **Morocco**
- National Institute for Marine Research and Development "Grigore Antipa", **Romania**
- Morigenos-Marine Mammal Research and Conservation Society, **Slovenia**
- Aula del Mar de Málaga (Andalucía); Centro de Recuperación de Fauna Silvestre "El Valle" (Murcia); Conselleria d'Agricultura i Pesca del Govern de les Illes Balears; Consejería de Medio Ambiente de la Ciudad Autónoma de Ceuta; Consejería de Medio Ambiente (Melilla); CRAM - Fundació per a la Conservació i Recuperació d'Animals Marins; Conselleria de Medio Ambiente de las Comunidad Valenciana, GRAMPUS (Colectivo para el Estudio y Conservación del Medio Marino, Huelva); Guardia Civil de Melilla; Sociedad Española de Cetáceos, CREMA, CEMMA, CEPESMA, UV (**Spain**)
- Biodiversity and Protected Areas Directorate, General Commission for Environmental Affairs, Ministry of Local Administration and Environment; General Establishment of Fisheries in Syria, **Syria**
- Turkish Marine Research Foundation, **Turkey**

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## **1. INTRODUCTION: THE MEDACES PROJECT**

### **1.1. Origin and history of MEDACES**

Cetacean strandings represent an important tool for the development of scientific programs on cetacean conservation. The occurrence of stranded dolphins and whales provides an invaluable opportunity to gain insight on aspects of their population biology, as well as to investigate causes of natural or anthropogenic mortality that will help to assess the impact of potential threats. Altogether, these data can be used to determine the health status of cetacean populations and to identify conservation problems and reveal unusual mass mortality episodes (Geraci and Lounsbury, 2005; Peltier et al., 2009).

Stranding networks have been developed over the last decades in countries concerned about cetacean conservation. The establishment of these stranding networks with centralized databases has facilitated the collection and dissemination of relevant information on these marine vertebrates and their conservation status.

The establishment of standards to keep the information and samples from cetacean strandings in the Mediterranean waters is very important. In this context, it is necessary to compile all details of cetacean strandings, including an inventory of the samples taken, on a single and properly database maintained by a Mediterranean Database of Cetacean Strandings (MEDACES).

According to the recommendations listed on Annex VII of the 11th Ordinary Meeting of the Contracting Parties of the Barcelona Convention and its Protocols of the Mediterranean Action Plan, UNEP (Malta, 27-30 October 1999), related to the ulterior implementation of the Action Plan for Cetacean Conservation in the Mediterranean Sea and other initiatives, the co-ordination of the information of stranded cetaceans on the coast of the Mediterranean countries is required for a better knowledge of cetaceans and their eventual protection and conservation.

In November 2001, the 12th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution and its Protocols, within the "Biological Diversity and Specially Protected Areas" section, recommended the implementation of an Action Plan for the Conservation of Cetaceans in the Mediterranean Sea, to approve the offer made by Spain with regards to the establishment in Valencia of a Mediterranean database on cetacean strandings

(MEDACES). The Regional Activity Centre for Specially Protected Areas (**RAC/SPA**) is the depositary of the database, whose management is entrusted to the University of Valencia's Cavanilles Institute of Biodiversity and Evolutionary Biology (**ICBIBE**), with the initial financial support of the Spanish Ministry of Environment and Rural and Marine Affairs (**MMA**). Nowadays, MEDACES database is supported exclusively by RAC SPA since 2010-11. This database strictly adheres to a deontological code.

The Mediterranean Database of Cetacean Strandings has been expanded to cover regions adjacent to the Mediterranean, i.e. the Black Sea and the contiguous Atlantic waters, as defined in the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (**ACCOBAMS**).

### **1.2. MEDACES Database and web-page**

MEDACES keeps the information sent by the collaborating institutions regarding to the strandings in a relational database. The information of every stranding record is stored in different, related tables. The main table of the database, Cetacean, contains the basic information, and the geographical location of the stranding. The tables related to this entity contain the basic information which includes the institution sending the data, the cetacean species, body measurements, etc. The advanced data contains information on the organs and samples taken and preserved for different types of life-history studies (toxicology, histology, reproductive state, feeding ecology and diet based on digestive contents, etc.).

MEDACES is managed as a geodatabase (*Geographic database*), of the ArcGis™ family from ESRI®, using the Microsoft Access software. The geodatabase is able to represent geographical data of the strandings, being able to get the location of any event in a map.

The MEDACES web-page provides information about the MEDACES project and the collaborating institutions. Moreover, the web-page allows downloads which give users access to forms that help to submit stranding data to the MEDACES database. The MEDACES web-page has two specific tools that are accessible for users: (1) a search function for information related to the strandings. The search tool contains searching criteria by species, sex, date, country, province and locality. The output is a printable list of records fulfilling the search criteria. Moreover, by clicking the number of the report, all the information of a stranding on the list is available. and (2) the stranding distribution on maps.

MEDACES database and its web-page (<http://medaces.uv.es>) are both operational. Nevertheless, the geodatabase server is not operational, and the data shown through the MEDACES webpage, although georeferenced, cannot be seen through the interface of the map. Georeferenced data can be provided via e-mail if this is required by a MEDACES user.

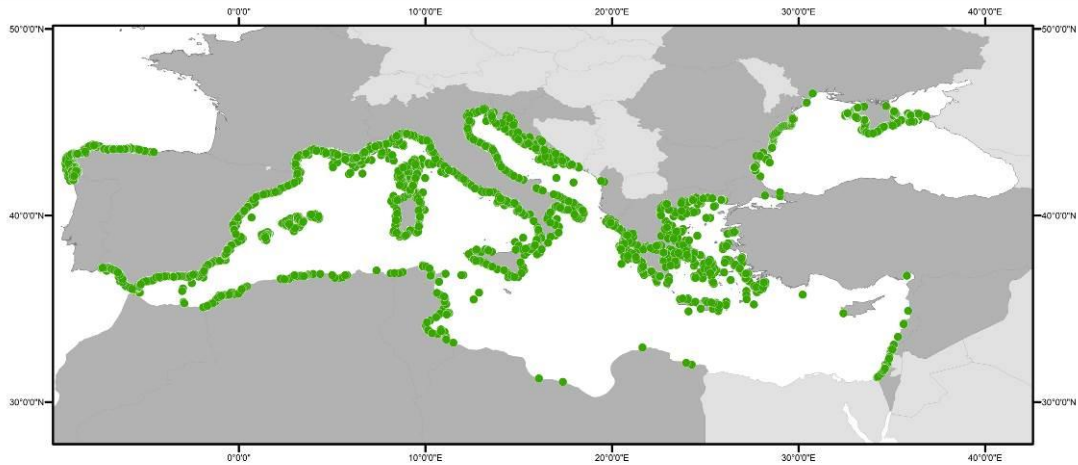


Figure 1. Map shown at 'Data set' ('Data') from MEDACES web-page where available cetacean stranding maps can be seen.

#### **1.4. Obtaining the data**

Stranding data has been sent to MEDACES by national stranding networks, national authorities, research and conservations institutions as well as RAC-SPA and ACCOBAMS. MEDACES provides three different options to facilitate the gathering of stranding data from the different institutions:

- **Database Extract:** The *Database Extract* option allows submission of extracts of large data sets. This is especially relevant for institutions with an extended experience and large amount of records on strandings in their own databases. Submitted data are later transferred to the MEDACES database.
- **Paper Form (MEDACES form.pdf):** Stranding data can also be filled into a paper copy of a PDF document prepared. This possibility is aimed at institutions with limited access to computer facilities.
- **MEDACES Form Excel:** The *MEDACES Form Excel* option allows data to be filled in and stored in a excel file format. The excel file can be sent to MEDACES by e-mail or by ordinary post.

The data submitted to MEDACES in the last years has been sent in database Extract option in EXCEL, which seems to be the quickest way of gathering the own institution data. In fact, since 2009 the data included to MEDACES database is the basic information of each stranding. NO advanced data is filled at the moment. In the cases that additional information is associated to the stranding, comments can be added by the institution contact.

The basic data included are:



Species
Province/State/County
Locality
Site of stranding (name of the beach, harbour, etc.)
Coordinates (latitude, longitude)
Date
Sex
Animal length (cm)
Stranded alive (status) / Stranded dead (carcass status)
Biological samples collected
Cause of death
Human interaction: none/boat collision/fishing gear/intentional/unknown
Comments

## **2. THE STRANDING DATA**

### **2.1. Collaborating institutions**

The MEDACES database currently contains stranding information from the coasts of Albania, Algeria, Bulgaria, Croatia, France, Greece, Israel, Lebanon, Libya, Monaco, Morocco, Romania, Slovenia, Spain, Syria, Tunisia and Turkey, Cyprus, Ukraine and Italy.

The following institutions have collaborated with their stranding data:

#### Albania

- Department of Biology-Chemistry, Faculty of Natural science, University of Shkodra (Denik Ulqini)

#### Algeria

- University of Oran Es Senia (Data provided by Regional Activity Centre for Specially Protected Areas (RAC/SPA))

### Bulgaria

- Institute of Fish Resources (Varna)
- Green Balkans NGOs

### Cyprus

- Fisheries and Marine Research Officer. Ministry of Agriculture, Natural Resources and Environment. Department of Fisheries and Marine Research. Nicosia

### Croatia

- Blue World Institute of Marine Research and Conservation
- Faculty of Veterinary Medicine, University of Zagreb
- State Institute for Nature Protection (SINP)

### France

- Groupe d'Etude des Cétacés de Méditerranée (Marseille)
- Centre de Recherche sur les Mammifères Marins de la Rochelle (CRMM)

### Greece

- ARION-Cetacean Rescue & Rehabilitation Research Centre (Petroupolis)
- Environmental Research Bureau (Milos)
- Fisheries Research Institute, National Agricultural Research Foundation (Kavala)
- Hellenic Centre for Marine Research

### Italy

- Museo di Storia Naturale di Milano and Dipartimento di Biologia Animale Università degli Studi di Pavia. Italy. Stranding data from 2001 to 2008
- Centro Studi Cetacei
- Museo di Storia Naturale di Milano
- Dipartimento di Biologia Animale Università degli Studi di Pavia
- Italian Stranding on-line Database (BDS)

### Israel

- Israel Marine Mammals Research and Assistance Center (IMMRAC)

### Lebanon

- Centre de Recherches Marines/CNRS. Batroun

#### Libya

- Marine Conservation, Nature Conservation Department, Environment General Authority
- Faculty of Natural Resources and Environmental Science. FNRES, Omar Mukhtar University. El-Beyda

#### Monaco

- Groupe d'Etude des Cétacés de Méditerranée (Marseille)
- ACCOBAMS (Monaco)

#### Morocco

- Naturalist group Guelaya: data sent by Niki Entrup (Whale and Dolphin Conservation Society)

#### Romania

- MARE NOSTRUM. Organizatia Ecologista Neguvernamentala.
- National Institute for Marine Research and Development "Grigore Antipa" (Constanta)

#### Slovenia

- Morigenos-Marine Mammal Research and Conservation Society (Ljubljana)

#### Spain

- División para la Protección del Mar. D.G. Sostenibilidad de la Costa y del Mar Ministerio de Agricultura, Alimentación y Medio Ambiente, Spain. Data from CEMMA Galicia, CEPESMA Asturias, Departament de Medi Ambient de la Generalitat de Catalunya, Conselleria de Territori i Habitatge de la Generalitat Valenciana, Universitat de València (Comunitat Valenciana), Conselleria d'Agricultura i Pesca del Govern de les Illes Balears, Fundació Marineland (Illes Balears), Centro de Recuperación de Fauna Silvestre "El Valle" (Murcia), Consejería de Medio Ambiente de Murcia, Aula del Mar de Málaga (Andalucía), Consejería de Medio Ambiente de la Junta de Andalucía, Consejería de Cantabria, Ecologistas en Acción Almería-PROMAR, CRAM - Fundació per a la Conservació i Recuperació d'Animals Marins (Cataluña), GRAMPUS (Colectivo para el Estudio y Conservación del Medio Marino, Huelva), Consejería de Medio

Ambiente de la Ciudad Autónoma de Ceuta, Septem Nostra (Ciudad Autónoma de Ceuta), Consejería de Medio Ambiente (Melilla), Equinac (Almería).

### Syria

- Biodiversity and Protected Areas Directorate, General Commission for Environmental Affairs, Ministry of Local Administration and Environment (Damascus)
- General Establishment of Fisheries in Syria

### Tunisia

- Faculté des Sciences de Sfax
- Institut National des Sciences et Technologie de la Mer -INST  
Regional Activity Centre of Special Protected Areas. UNEP-MAP

### Turkey

- Turkish Marine Research Foundation (Istanbul)

### Ukraine

- Brema Laboratory (Simferopol)

Since last MEDACES report in 2013, MEDACES has been updated when new stranding data has been sent to the MEDACES administrators.

### **1.Data included in MEDACES since last report (2013).**

- ISRAEL. Israel Marine Mammals Research and Assistance Center. The Recanati Institute for Maritime Studies. University of Haifa.
- SPAIN. División para la Protección del Mar. D.G. Sostenibilidad de la Costa y del Mar. Ministerio de Agricultura, Alimentación y Medio Ambiente.
- LYBIA. Faculty of Natural Resources and Environmental Science, FNRES, Omar Mukhtar University.
- BULGARIA. Green Balkans NGOs
- CROATIA. Department of Anatomy, Histology and Embriology. Faculty of Veterinary Medicine.
- TUNISIA. Institut National des Sciences et Technologies de la Mer (INSTM), Sfax.
- LEBANON. Centre de Recherches Marines, CNRS.



## 2.2. Stranding data

### 2.2.1. Total data in MEDACES / Contribution of each collaborating country

Twenty riparian countries are contributing with their data to MEDACES (see Table 1 and 2). The database contains information on strandings dating back to 1941 (from Tunisia). In total, data from 16,188 strandings are registered in the MEDACES database.

Table 1. List of countries contributing to MEDACES, period (years) and number of stranding records included.

			<b>NUMBER OF STRANDING DATA</b>
<b>COUNTRY</b>	<b>YEAR BEGINING</b>	<b>YEAR END</b>	
Albania		?	2
Algeria	1975	2008	158
Bulgaria	2009	2014	233
Croatia	1990	2013	276
Cyprus	1999	2013	35
France	1968	2011	2,176
Greece	1944	2006	1,175
Israel	1993	2015	264
Italy	1997	2008	1,113
Lebanon		2013	3
Libya	2009	2013	5
Monaco	1989	2008	7
Morocco	2005	2005	1
Romania	2002	2014	826
Slovenia	2005	2008	4
Spain	1960	2013	8,490
Syria		?	1
Tunisia	1941	2013	160
Turkey	2000	2002	5
Ukraine	1980	2010	1,251
<b>TOTAL</b>			<b>16,185</b>

Figure 2 shows relative contribution of stranding record submissions from each of the participating countries. France, Greece, Italy, Spain, Ukraine and Romania are the countries with the highest number of submitted records.

It should be taken into account that stranding numbers depend on the length of coast line, size of cetacean species populations in adjacent waters, period of time from which data have been submitted, performance of the existing stranding networks, and other factors.

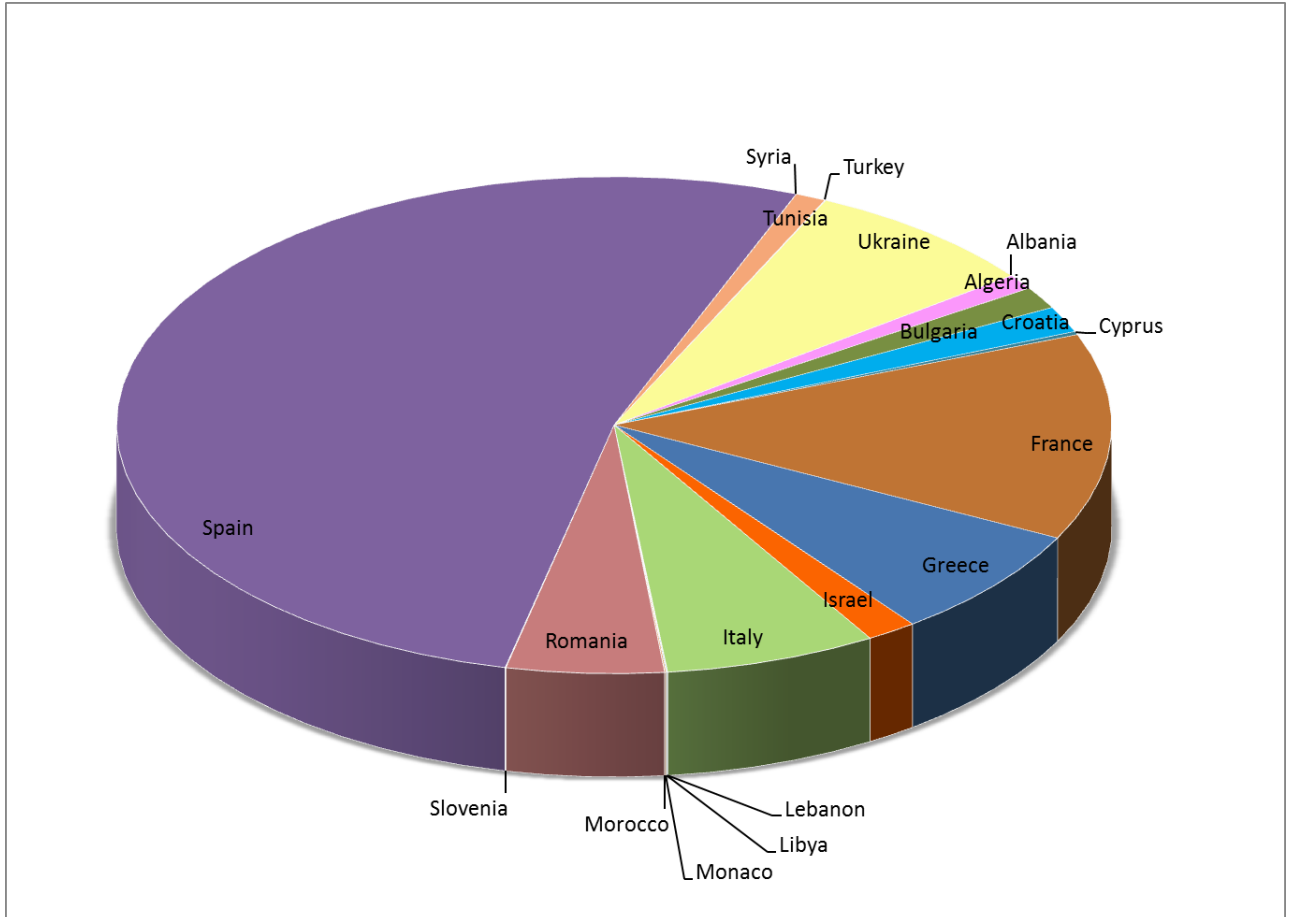


Figure 2. Strandings percentage sent to MEDACES by each country.

Figure 3 shows the relative contribution made by countries with less than ten stranding records sent to MEDACES.

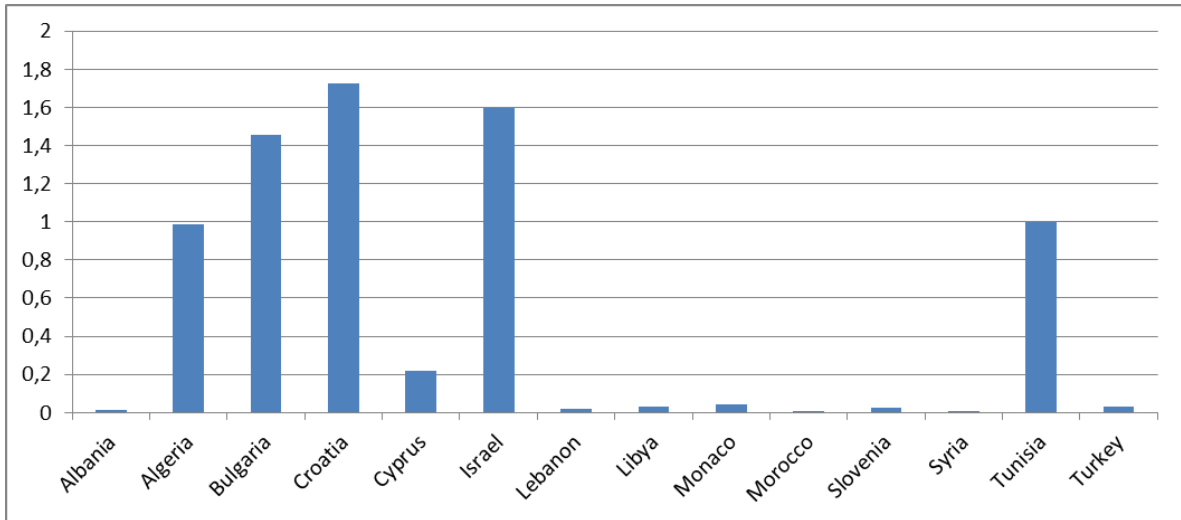


Figure 3. Strandings percentage of countries with minor contribution sent to MEDACES.

To date, almost all Mediterranean countries and the Black Sea coasts have contributed to the database. Figure 4 shows the distribution of the strandings registered in MEDACES.

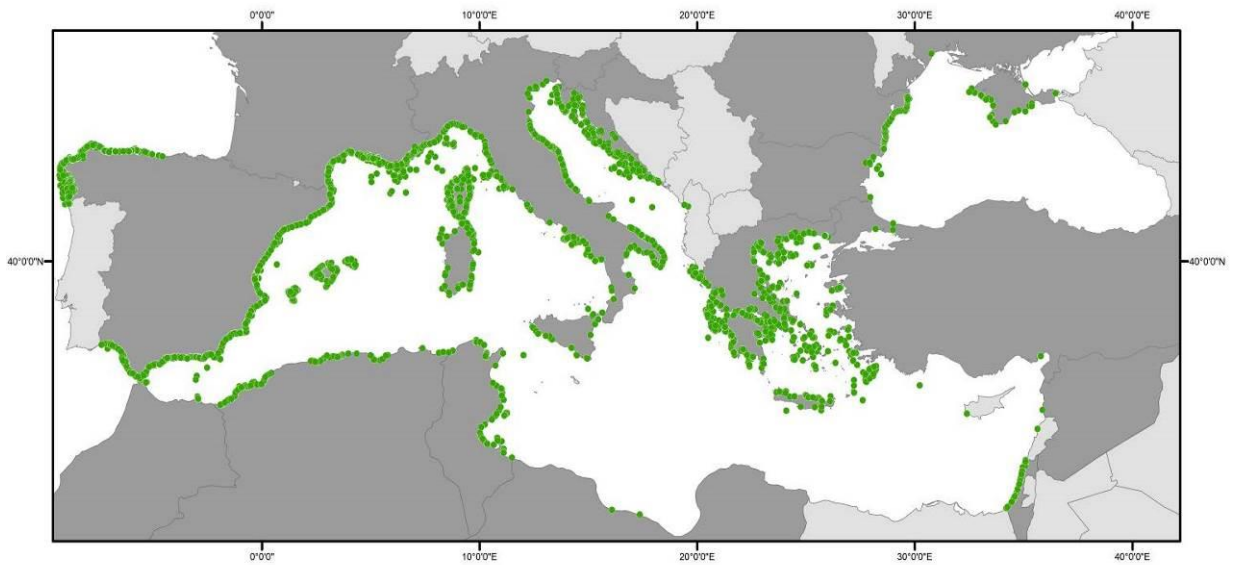


Figure 4. Cetacean stranding located along the Mediterranean and Black Sea coast using the data collected so far. Countries contributing with data to MEDACES are shown in dark grey colour. Green dots correspond to the stranding records.



### 2.2.2. Stranding species and numbers

Stranding data from MEDACES are consistent with the available information about the distribution of cetacean species in the Mediterranean and Black Seas (Notarbartolo and Birkum, 2010, Notarbartolo di Sciara, 2002 and references therein). The most common **cetacean species stranded** in the **Mediterranean sea** are (see Figure 5 and 6): fin whale, *Balaenoptera physalus*; sperm whale, *Physeter macrocephalus*; Cuvier’s beaked whale, *Ziphius cavirostris*; long-finned pilot whale, *Globicephala melas*; Risso’s dolphin, *Grampus griseus*; striped dolphin, *Stenella coeruleoalba*; common dolphin, *Delphinus delphis* and bottlenose dolphin, *Tursiops truncatus*. In the coasts of the Black Sea, the species are harbour porpoise (*Phocoena phocoena relicta*), common dolphin (*Delphinus delphis ponticus*) and bottlenose dolphin (*Tursiops truncatus aduncus*). Figure 5 shows an important increase of the recordings in the last year for short beaked Common dolphin, harbour porpoise, and “others” (specially ziphiids and seals), due to the inclusion of the strandings occurring in the Atlantic waters of Spain.

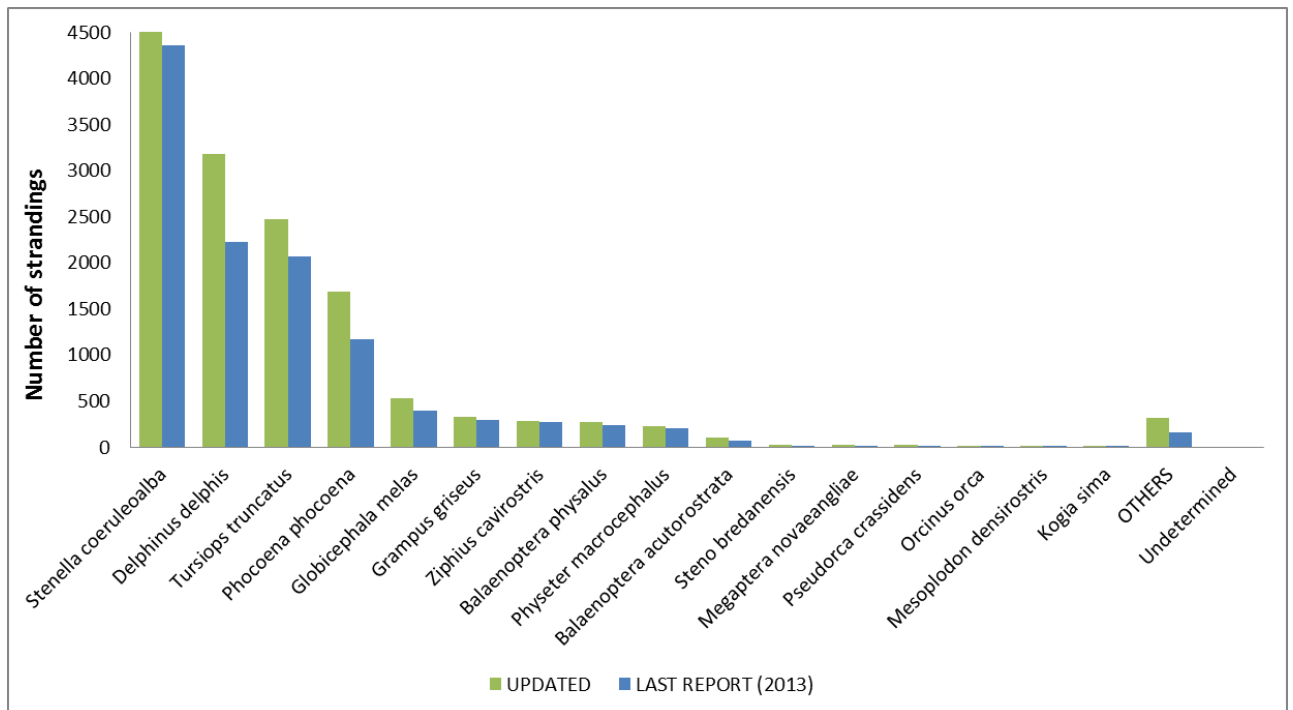
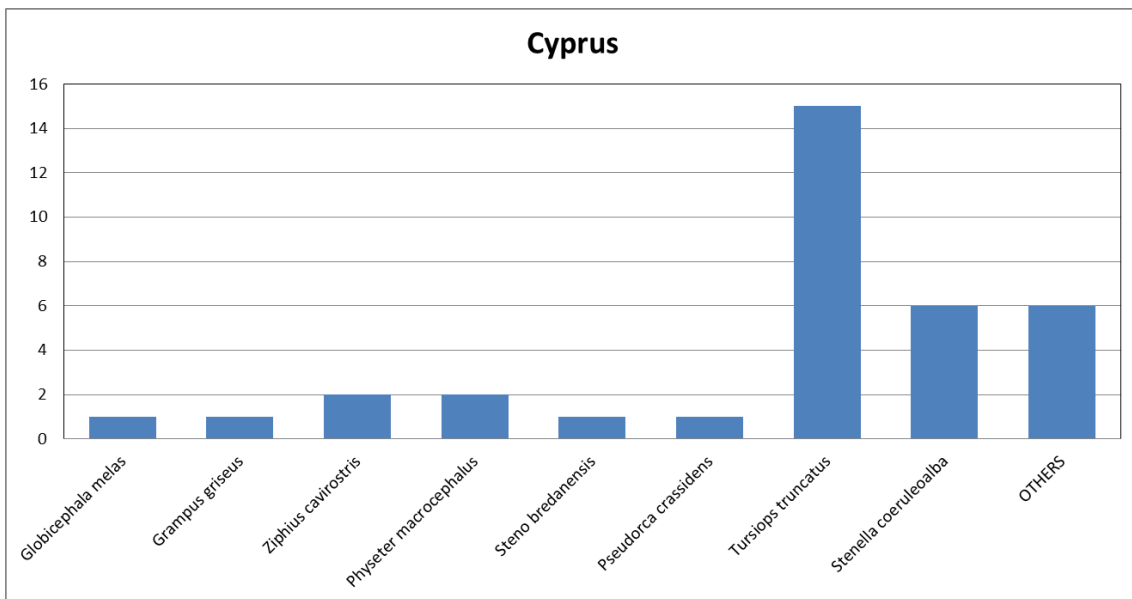
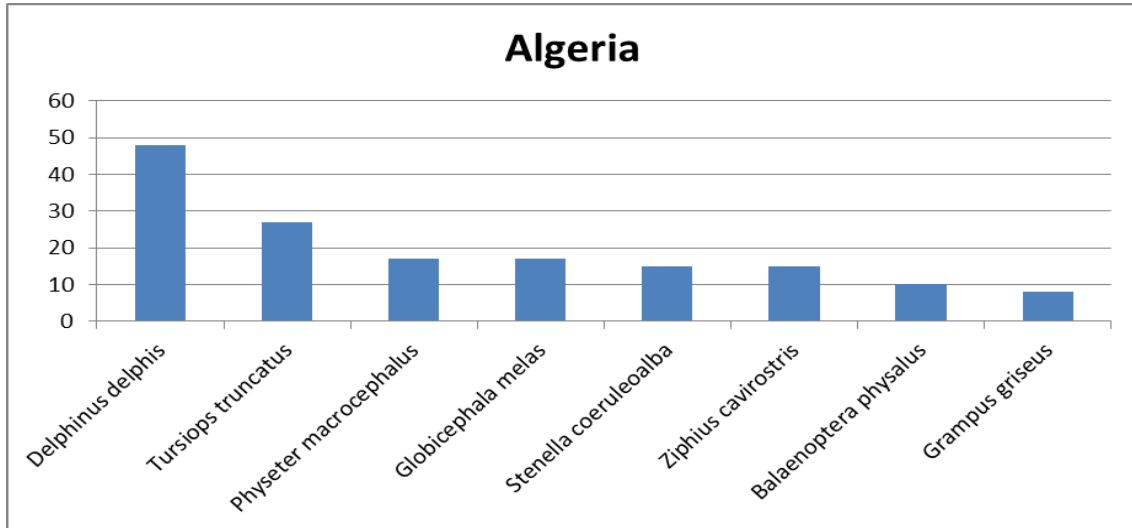
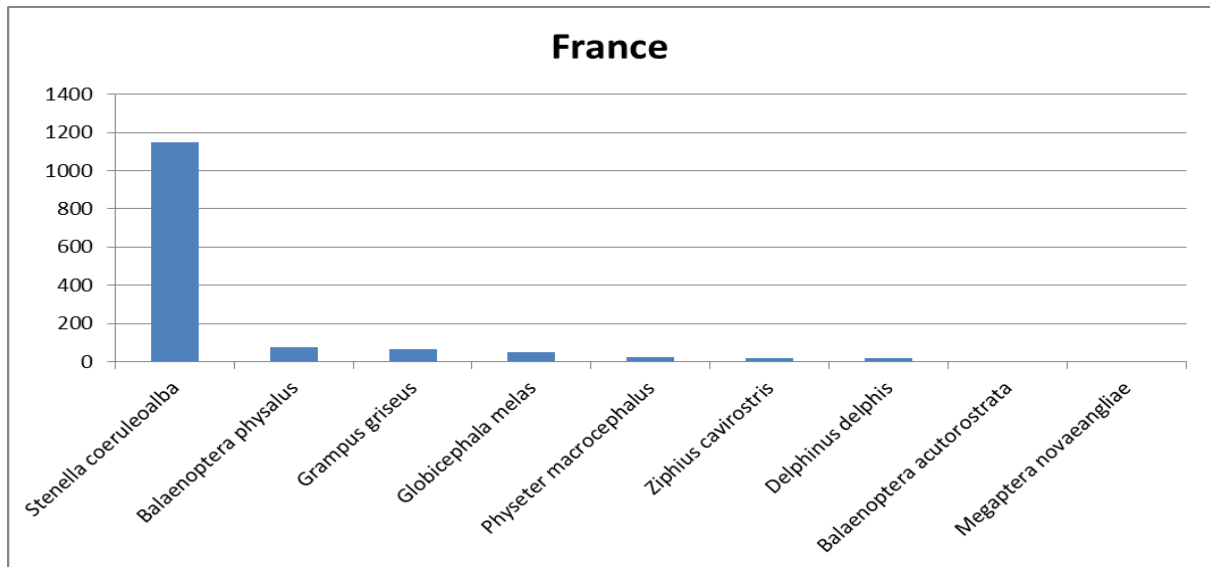
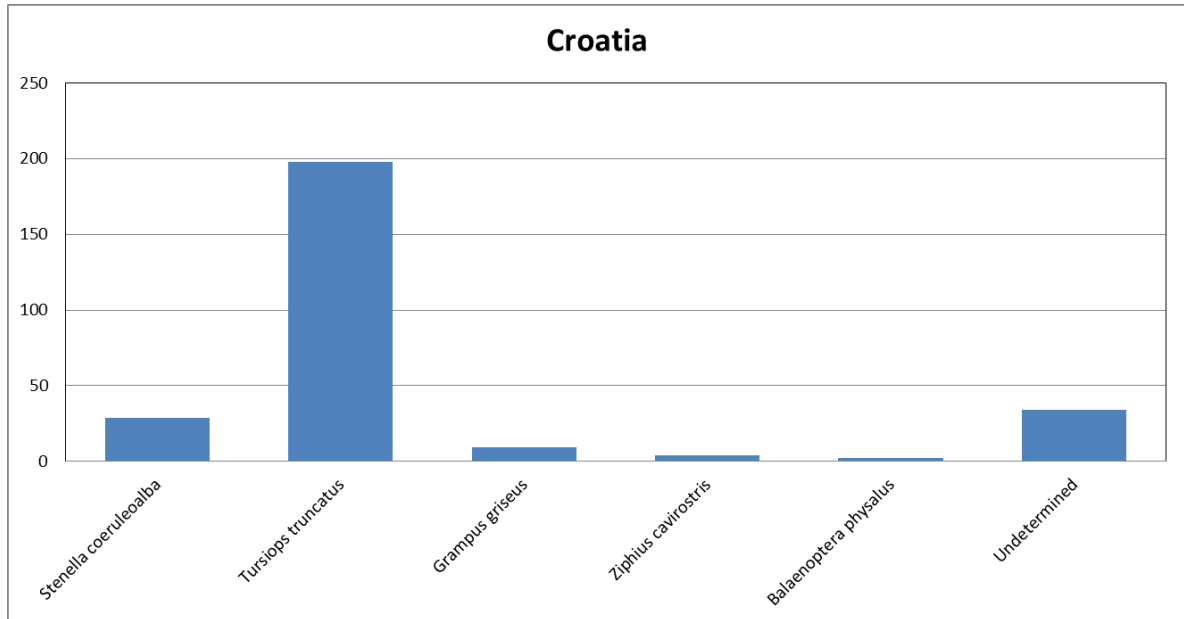
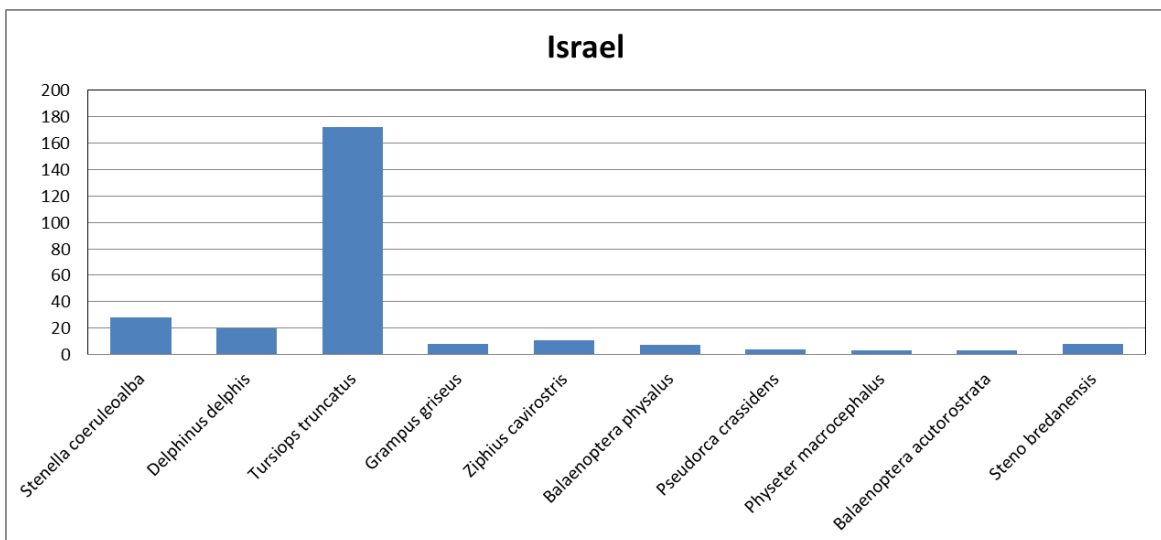
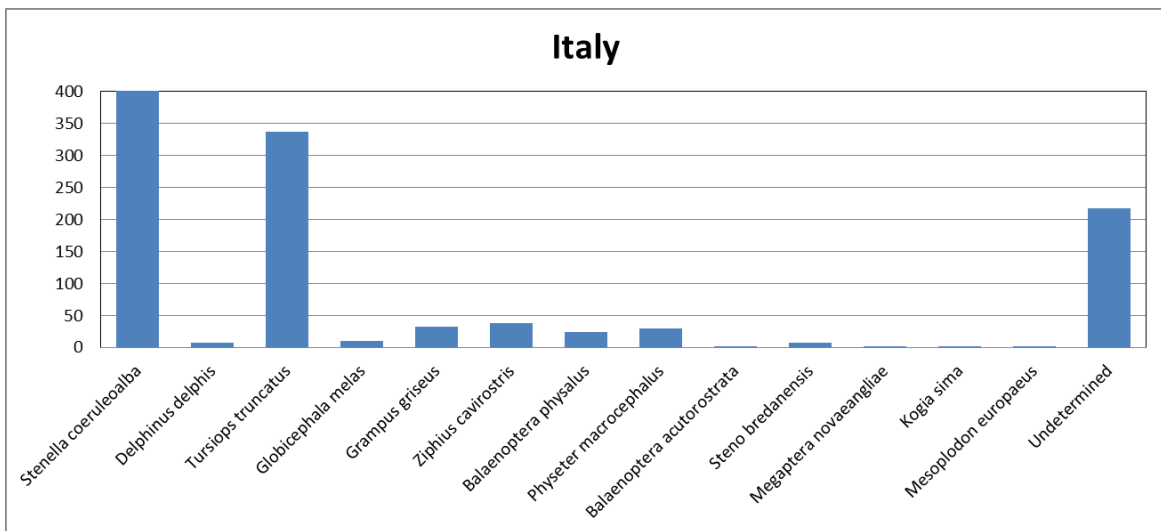
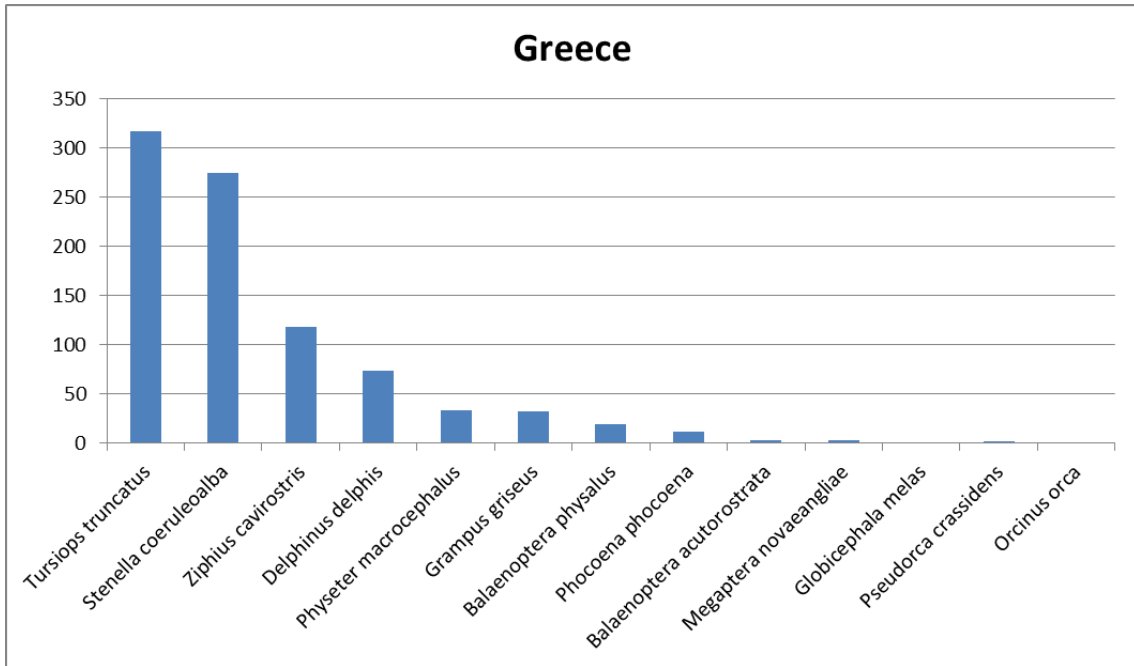


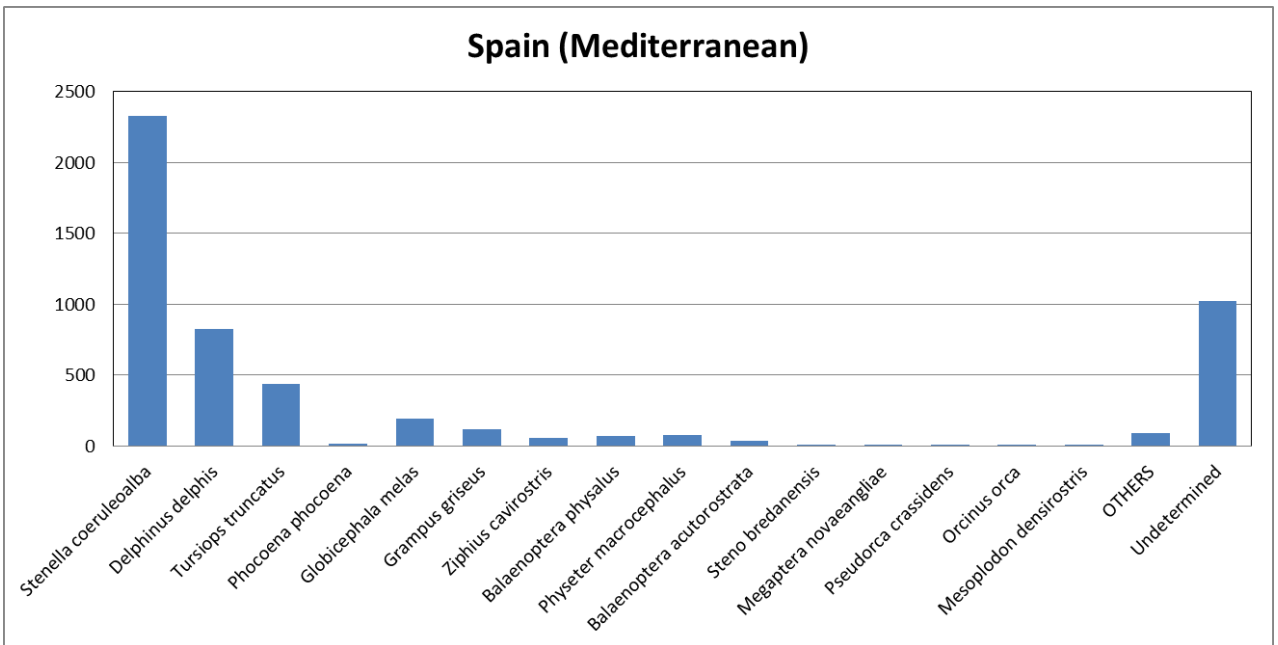
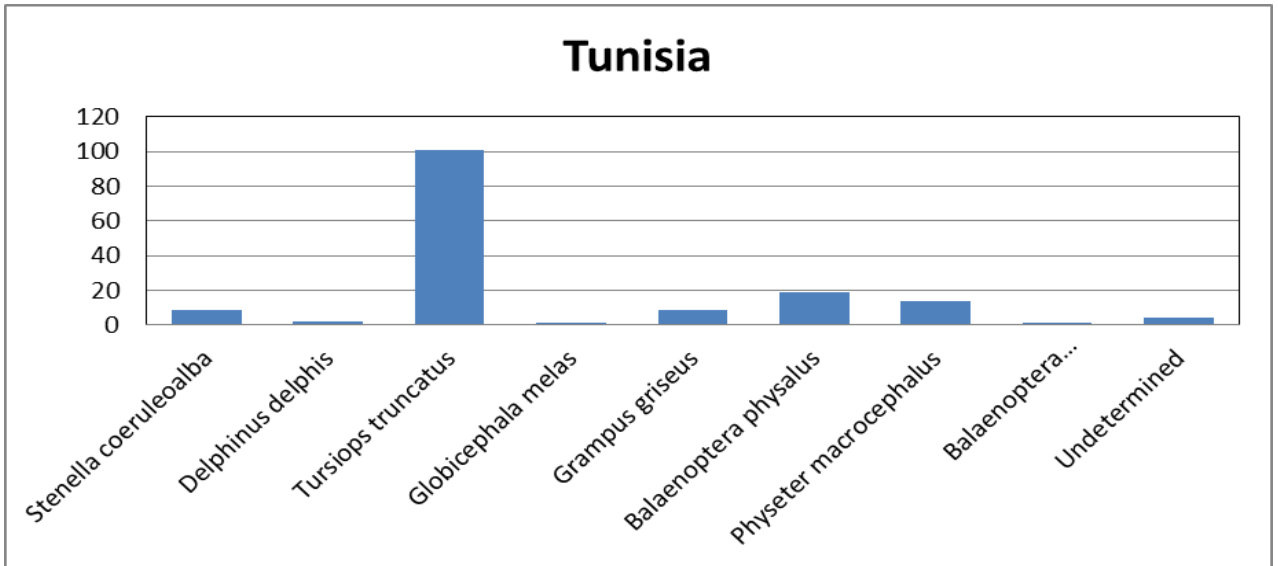
Figure 5. Number of strandings of each cetacean species recorded in MEDACES database along the coasts of all the riparian countries of the Mediterranean and Black Seas.

## MEDITERRANEAN SEA

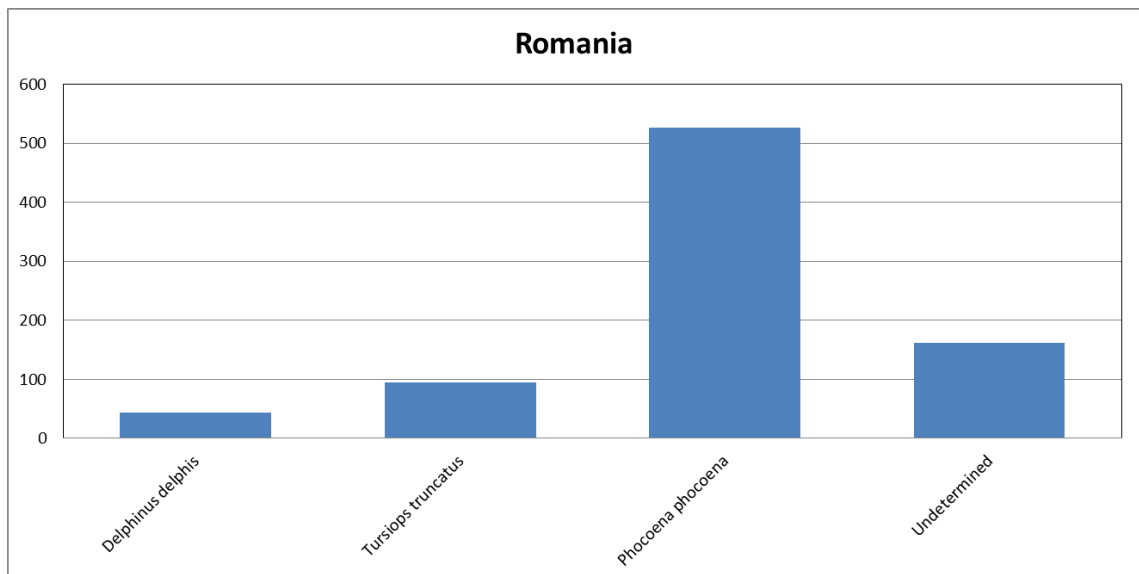
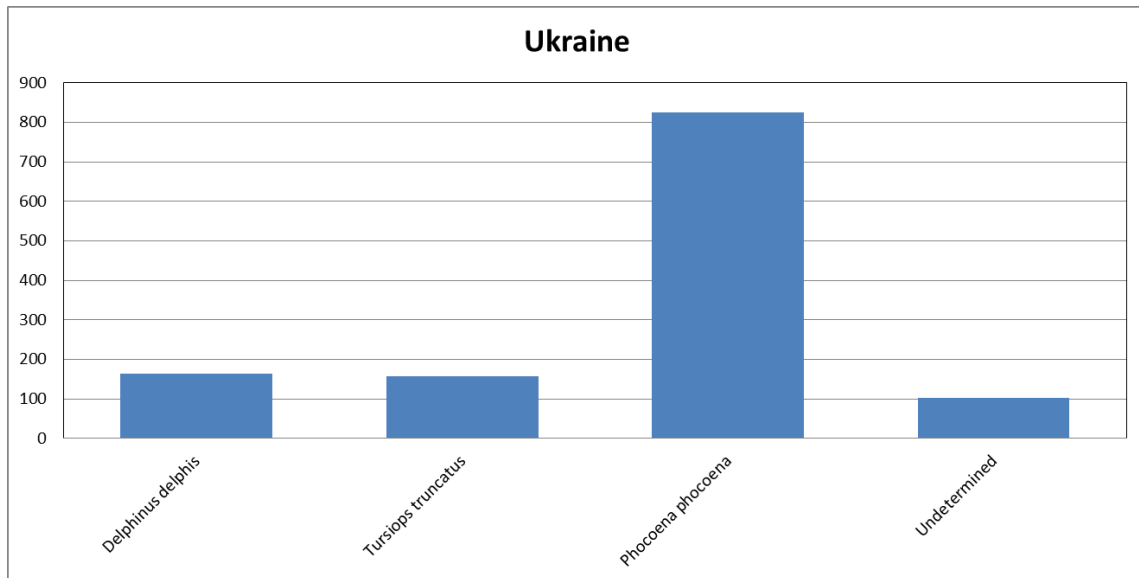
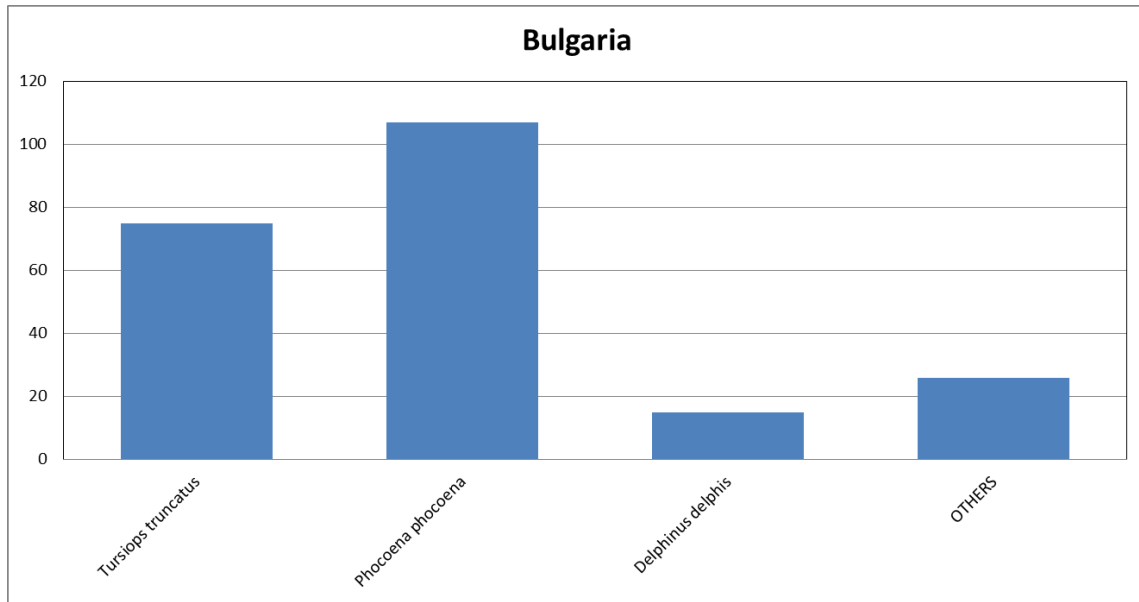








## BLACK SEA



## ATLANTIC WATERS

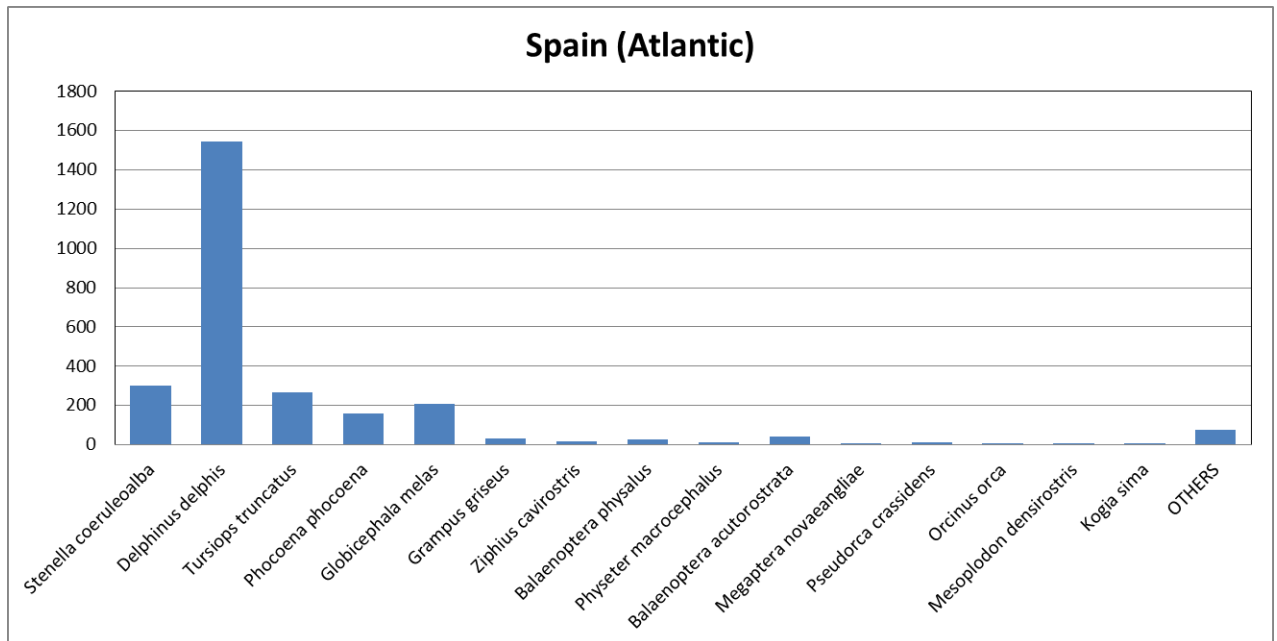


Figure 6. Number of specimens of each cetacean species stranded and reported in MEDACES individually by each of the riparian countries of the Mediterranean and Black Seas. Spanish reports have been divided in Atlantic (Galicia, Asturias, Cantabria, and Huelva) and Mediterranean strandings (rest of Spain)

Table 2. Presence of species stranded along the coasts of the riparian countries of the Mediterranean and Black Seas. Ba, *Balaenoptera acutorostrata*; Bp, *Balaenoptera physalus*; Dd, *Delphinus delphis*; Gg, *Grampus griseus*; Gm, *Globicephala melas*; Ks, *Kogia sima*; Md, *Mesoplodon densirostris*; Mn, *Megaptera novaengliae*; Oo, *Orcinus orca*; Pc, *Pseudorca crassidens*, Pm, *Physeter macrocephalus*; Pp, *Phocoena phocoena*; Sb, *Steno bredanensis*; Sc, *Stenella coeruleoalba*; Tt, *Tursiops truncatus*; Zc, *Ziphius cavirostris*, O, others; U. unknown. *Balaenoptera musculus*, *Globicephala macrorhynchus*, *kogia breviceps*, *Lagenorhynchus acutus* and *Mesoplodon mirus* only recorded in Spain.

COUNTRY	Ba	Bp	Dd	Gg	Gm	Ks	Mn	Oo	Pc	Pm	Pp	Sb	Sc	Tt	Zc	U	O
ALBANIA														X			x
BULGARIA			X								X			X			
CYPRUS				x	x				x	X		x	X	x	x		
ALGERIA		X	X	X	X					X			X	X	X		X
SPAIN	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FRANCE	X	X	X	X	X		X			X		X	X	X	X	X	X
GREECE	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
CROATIA		X		X									X	X	X	X	
ITALY	X	X	X	X	X	X	X			X		X	X	X	X	X	X
ISRAEL	X	X	X	X					X	X		X	X	X	X		
LEBANON														X			
LIBYA		X								X				X		X	
MOROCCO																X	
MONACO													X			X	
ROMANIA			X								X			X		X	
SLOVENIA														X		X	
SYRIA																	
TUNISIA	X	X	X	X	X					X			X	X		X	
TURKEY		X	X											X			
UKRAINE																	



Spain is the country with the highest reported stranded species (n=20), being explained by the high diversity of species present in the Atlantic Ocean. Moreover, 3 species of pinnipeds are recorded (*Halichoerus grypus*, *Phoca vitulina*, and *Cystophora cristata*), and one mustelidae (*Lutra lutra*).

Greece takes next place, with 14 species, followed by Italy (12), France with 11, Israel with 10, Tunisia and Algeria with 8 and Croatia with 5 (Table 2).

Striped dolphin is the most species stranded in France (1356 strandings recorded), Italy (403) (although the number of bottlenose dolphin in Italy is very similar), and Spanish Mediterranean (2328). Bottlenose dolphin is more abundant in Cyprus (15), Croatia (198), Greece (315), Israel (172) and Tunisia (101). Short beaked common dolphin have higher number of strandings than other species in Algeria (48) and Spanish Atlantic (1542), meanwhile harbour porpoise is the most abundant in Bulgaria (107), Ukraine (825) and Romania (527). Some countries have little records in order to know trends (Turkey, Libya, Lebanon, Slovenia, Syria, Morocco, and Monaco).

Overall, the two species most frequently recorded are the striped dolphin, especially in countries like Spain, France, and Italy. However, in the Mediterranean it is important to notice that some countries like Greece, Tunisia, Algeria, Israel, and Croatia do not follow this pattern, as there are more records of bottlenose dolphin than those of striped dolphins. This could be explained by the kilometres of coast of these countries, and the coastal habitat of bottlenose dolphins compared to striped dolphins. In the other hand, the two Morbillivirus epizootic episodes that occurred in 1990 and 2007, especially affected populations of striped dolphins in Spain, France and Italy.

For the Black Sea three cetacean species: *D. delphis ponticus*, *T. truncatus aduncus* and *P. phocoena relicta* were reported by Bulgaria, Romania, and Ukraine.

It must be taken into account the high number of harbour porpoises (1,683) that are registered stranded in MEDACES. This number could be comparable with the number of bottlenose dolphins and common dolphins stranded. Almost all records of harbour porpoises come from the Black Sea, with the exception of 175 stranded cases in Spain and 12 in Greece.

Table 3. Number of strandings of Harbour porpoise in the Mediterranean and in the Black Sea.

	<i>Phocoena phocoena phocoena</i> Mediterranean	<i>Phocoena phocoena relicta</i> Black Sea
2000	13	
2001	16	
2002	17	30
2003	19	143
2004	24	27
2005	12	41
2006	8	99
2007	10	13
2008	10	32
2009	17	25
2010	14	74
2011	24	101
2012	11	214
2013	21	62

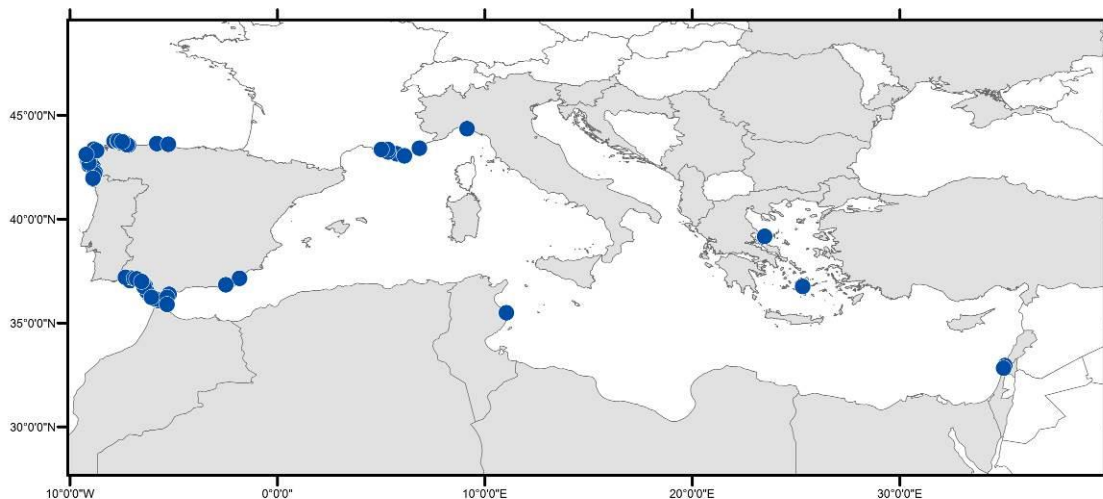
### 2.2.3. Distribution of the stranded species

Not every species is uniformly distributed along the Mediterranean coast: strandings of *G. melas* are almost exclusive from the Western Mediterranean, whereas strandings of *D. delphis* are more abundant in the south of Spain (Alboran Sea) and in Greece. Strandings of other species have been reported occasionally in the Mediterranean: Sowerby's beaked whale (*Mesoplodon bidens*), humpback whale (*Megaptera novaeangliae*), killer whale (*Orcinus orca*), false killer whale (*Pseudorca crassidens*), dwarf sperm whale (*Kogia sima*), pygmy sperm whale (*Kogia breviceps*) and Blainville's beaked whale (*Mesoplodon densirostris*). Strandings of rough-toothed dolphin (*Steno bredanensis*) are not common in the Mediterranean basin but records seem to concentrate it in the Eastern Mediterranean (see Israel strandings).

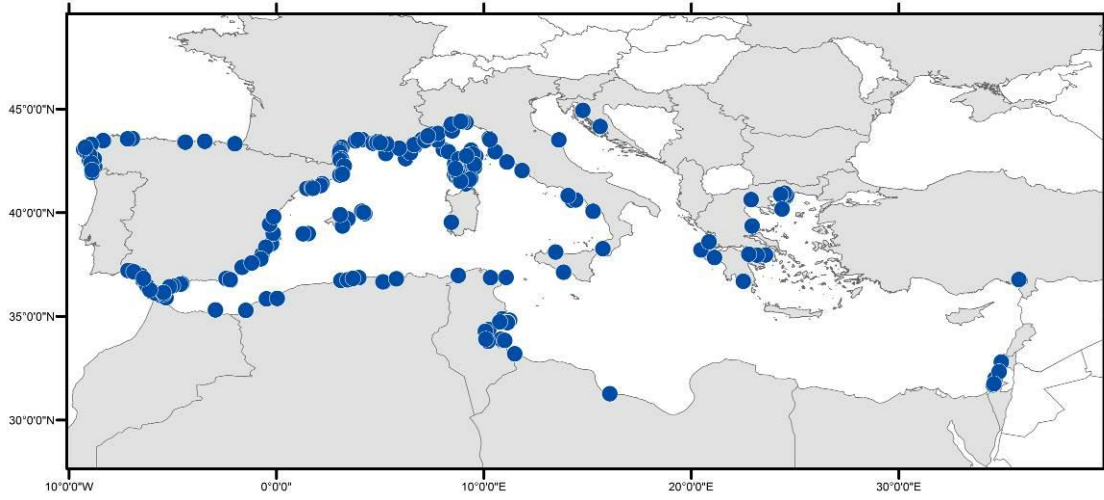
As the MEDACES database includes the adjoining Atlantic waters (Atlantic coast of Spain), strandings of several typically Atlantic species have been reported from this area, as minke whale (*Balaenoptera acutorostrata*) and harbour porpoise (*Phocoena phocoena*), Short beaked common dolphin (*Delphinus delphis*), short finned pilot whale (*Globicephala melas*), and several species of ziphiids.

For the Black Sea (data from Bulgaria, Romania, and Ukraine), three cetacean species have been reported: *D. delphis ponticus*, *T. truncatus aduncus* and *P. phocoena relicta* (Figure 7). The latter species is the most frequently stranded in this region. Some strandings of this species occurred also in Mediterranean waters contiguous to the Black Sea (Northern Greek waters).

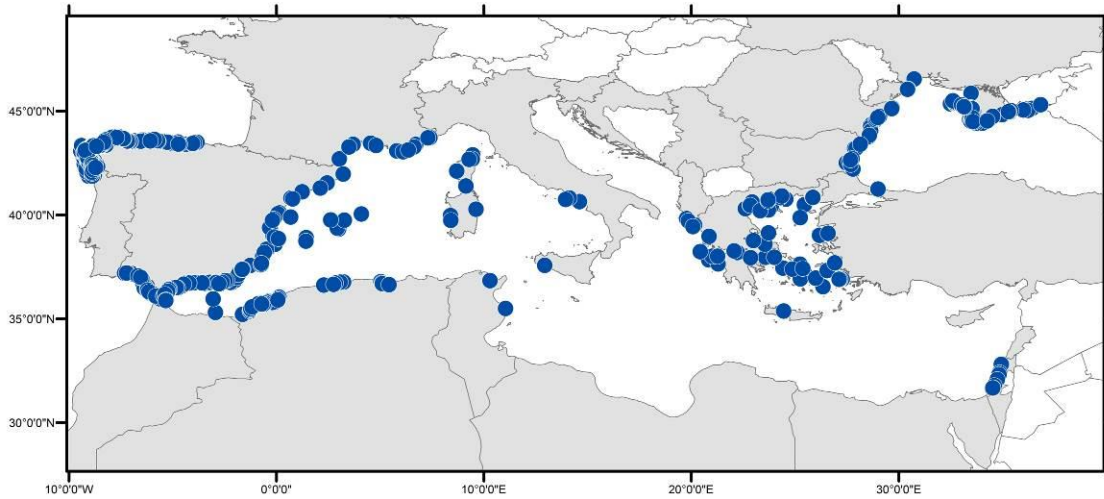
#### *Balaenoptera acutorostrata*



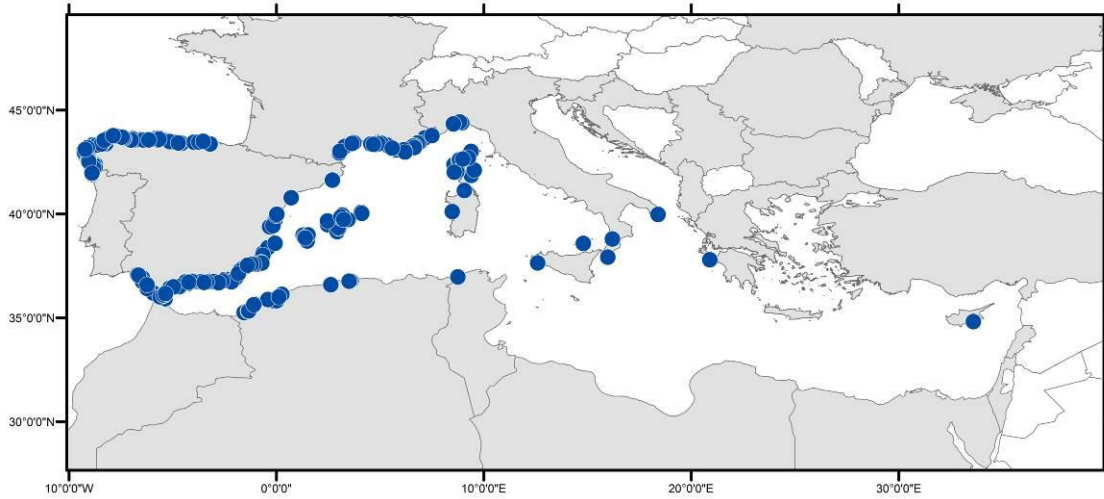
*Balaenoptera physalus*



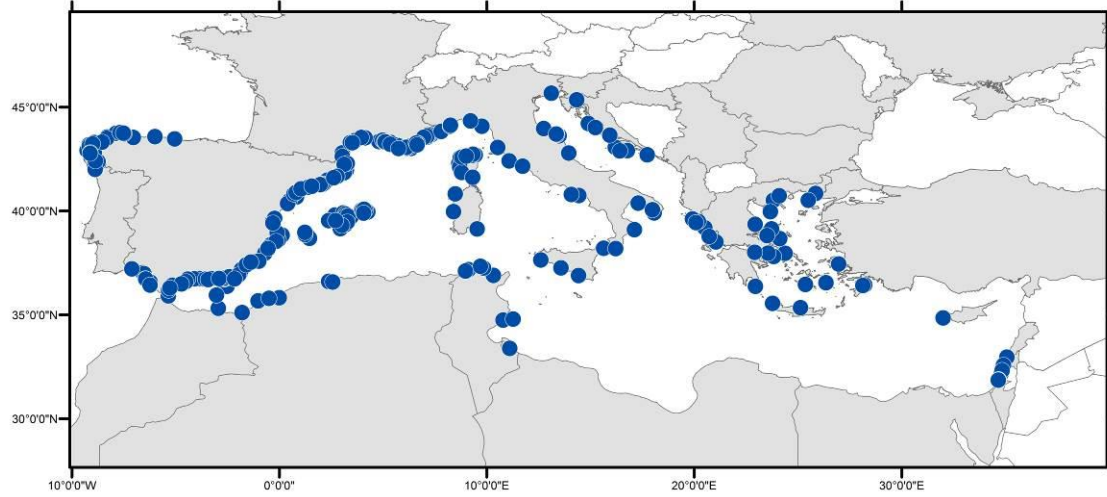
*Delphinus delphis*



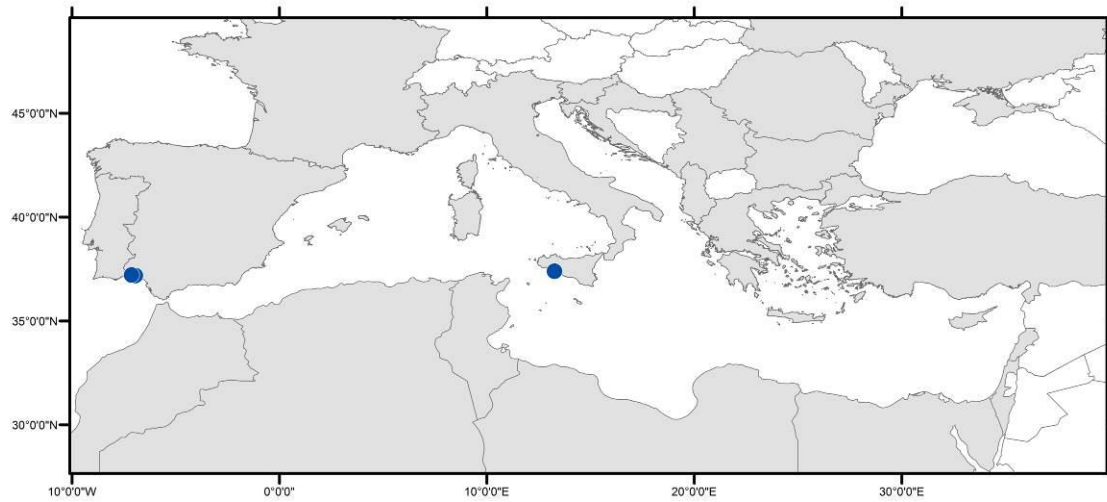
*Globicephala melas*



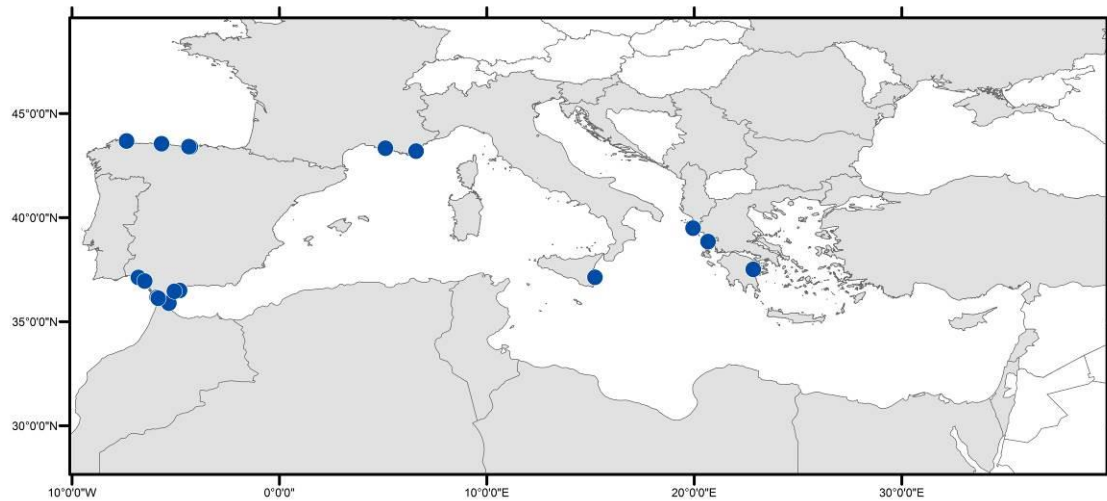
*Grampus griseus*



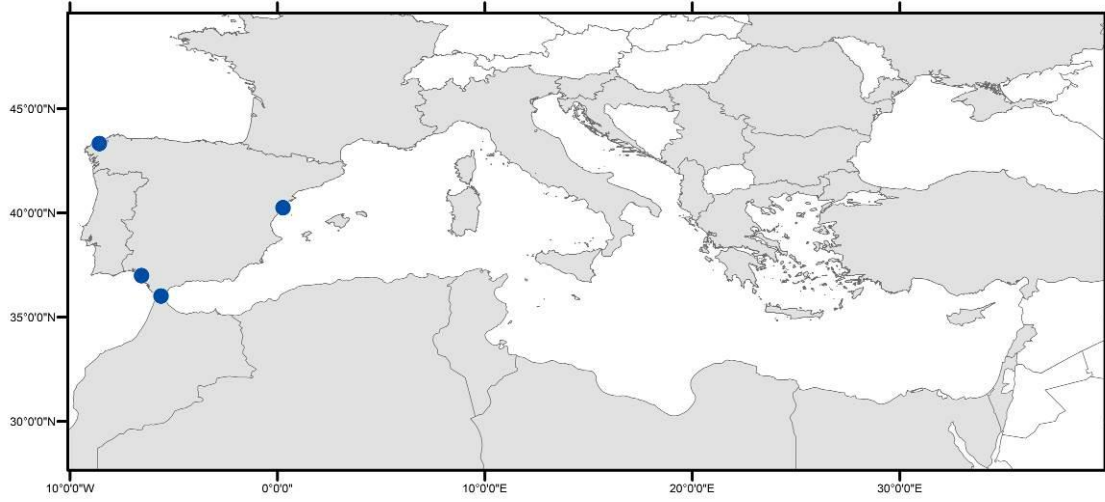
*Kogia sima*



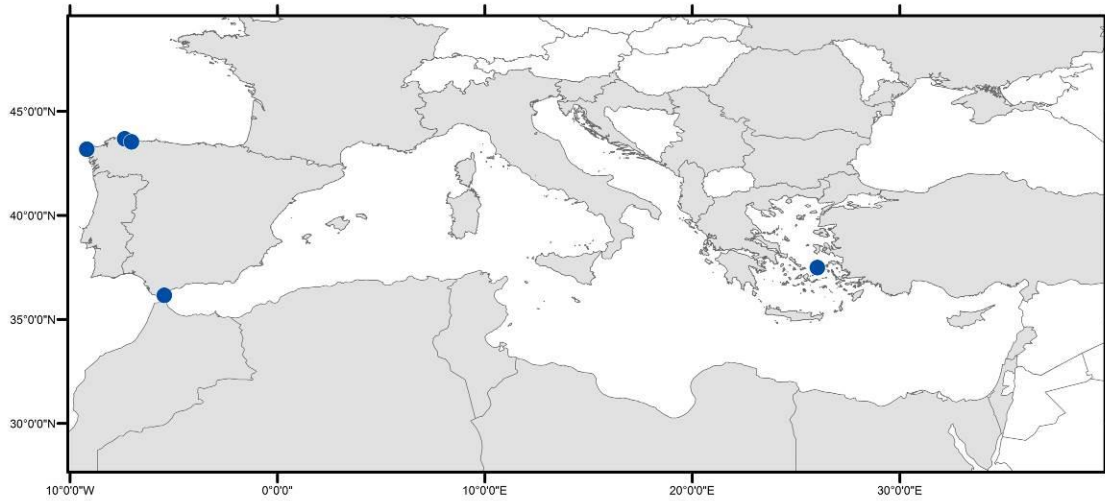
*Megaptera novaengliae*



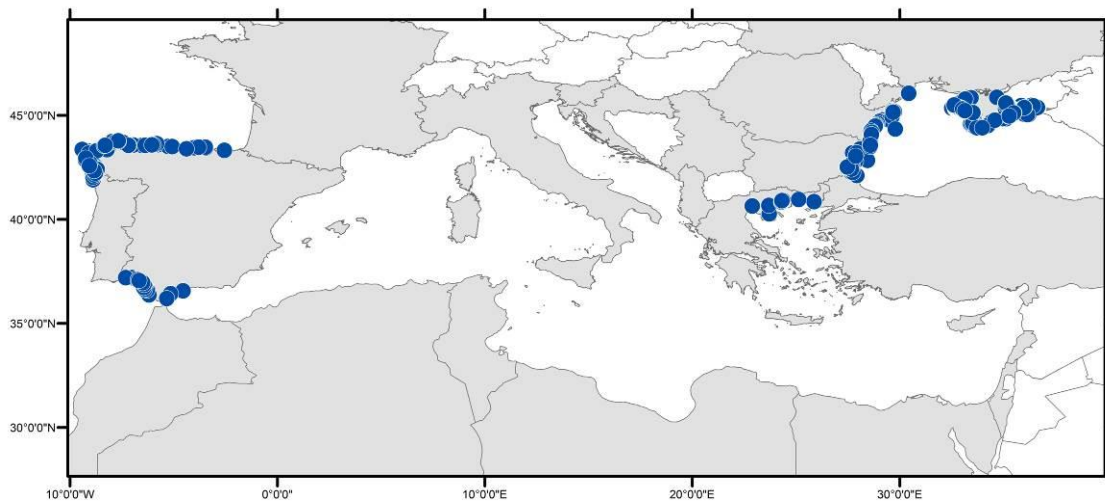
*Mesoplodon densirostris*



*Orcinus orca*

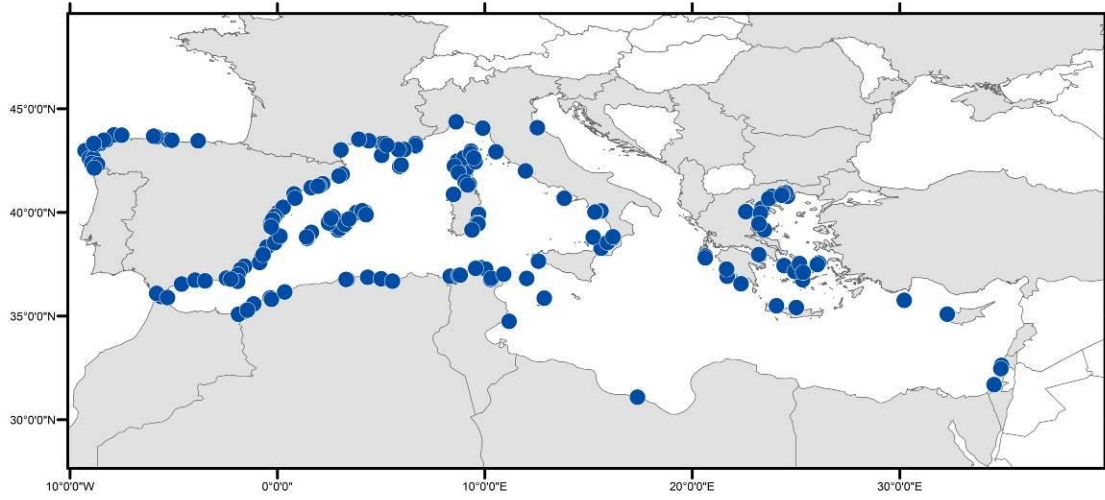


*Phocoena phocoena*

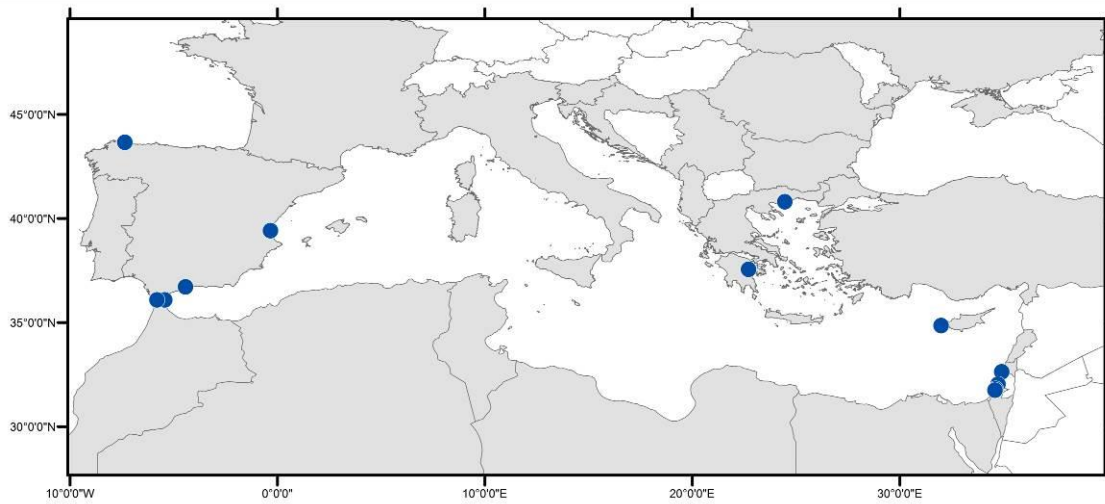




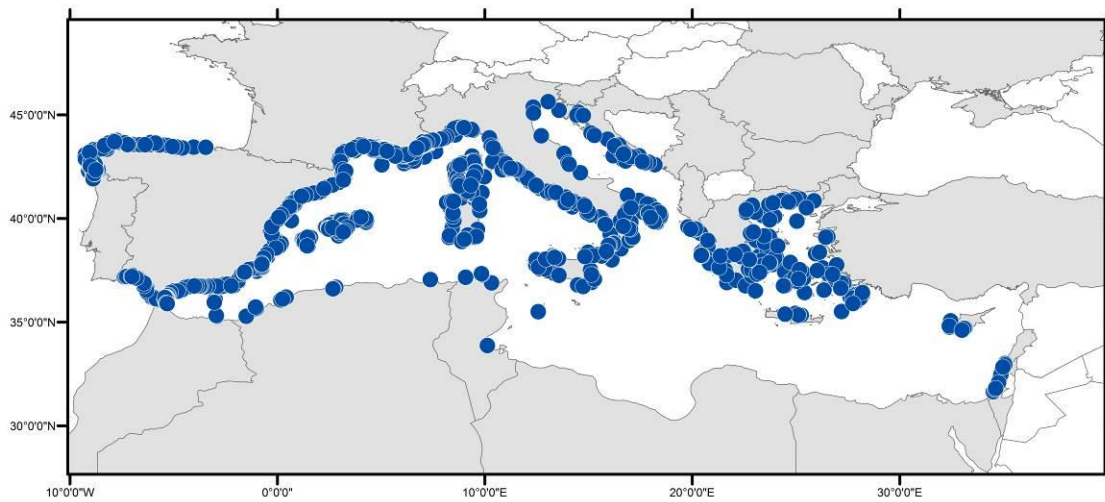
*Physeter macrocephalus*



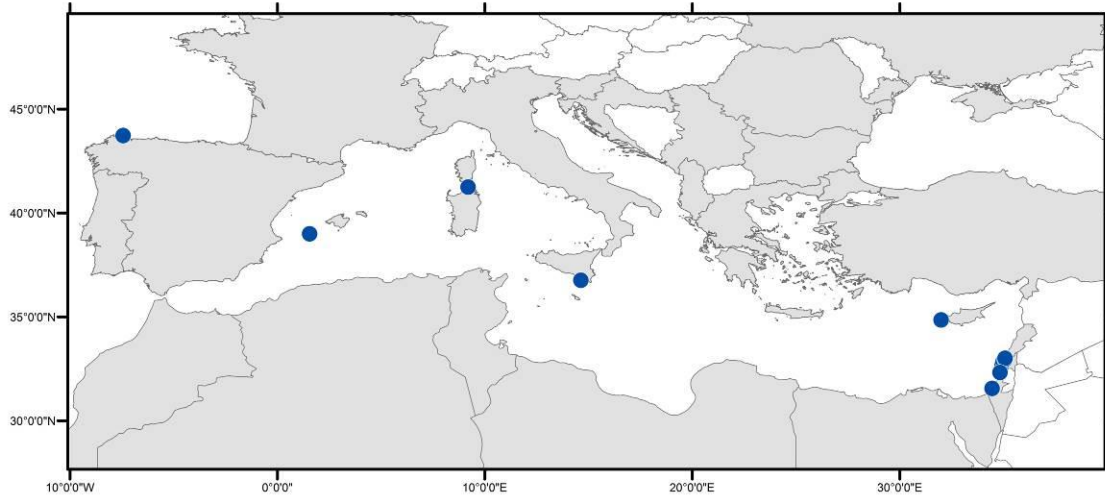
*Pseudorca crassidens*



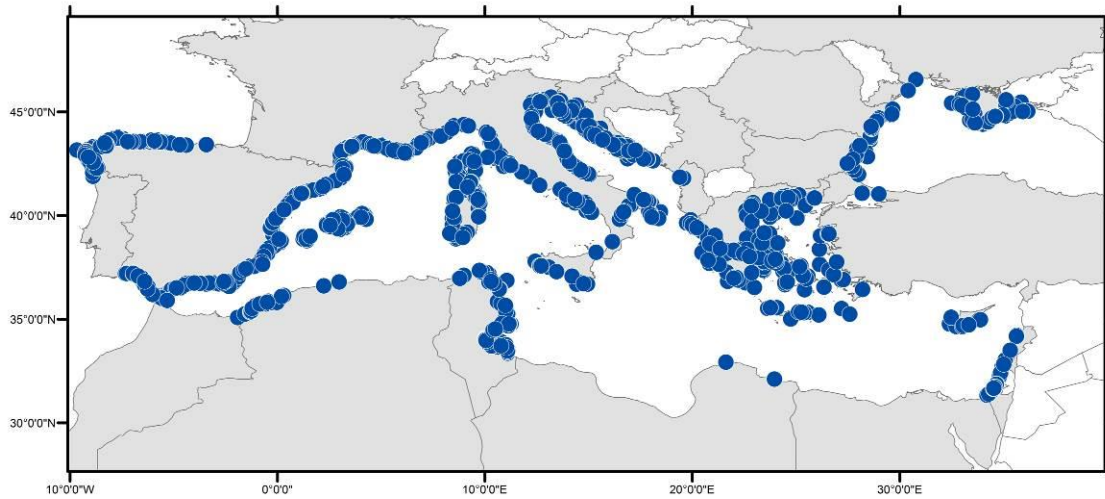
*Stenella coeruleoalba*



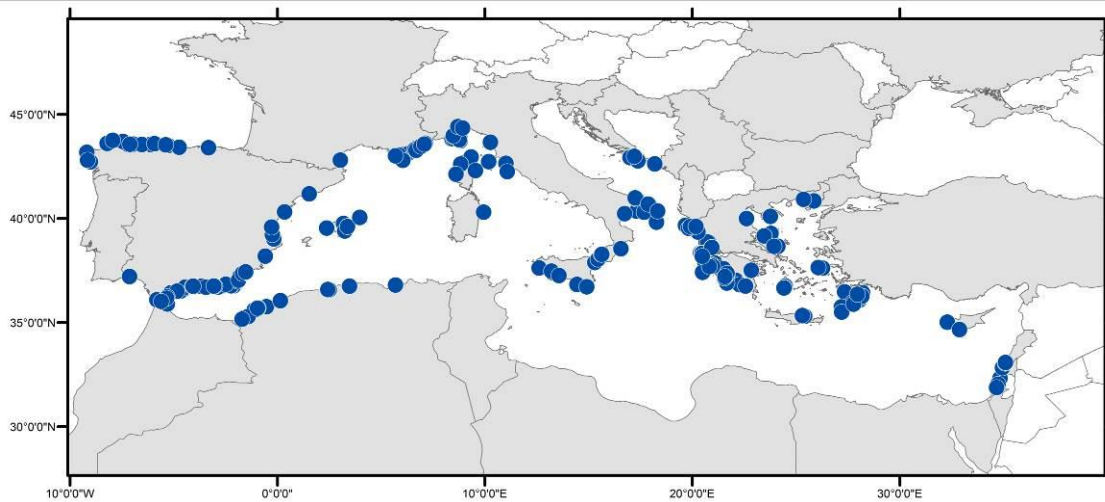
*Steno bredanensis*



*Tursiops truncatus*

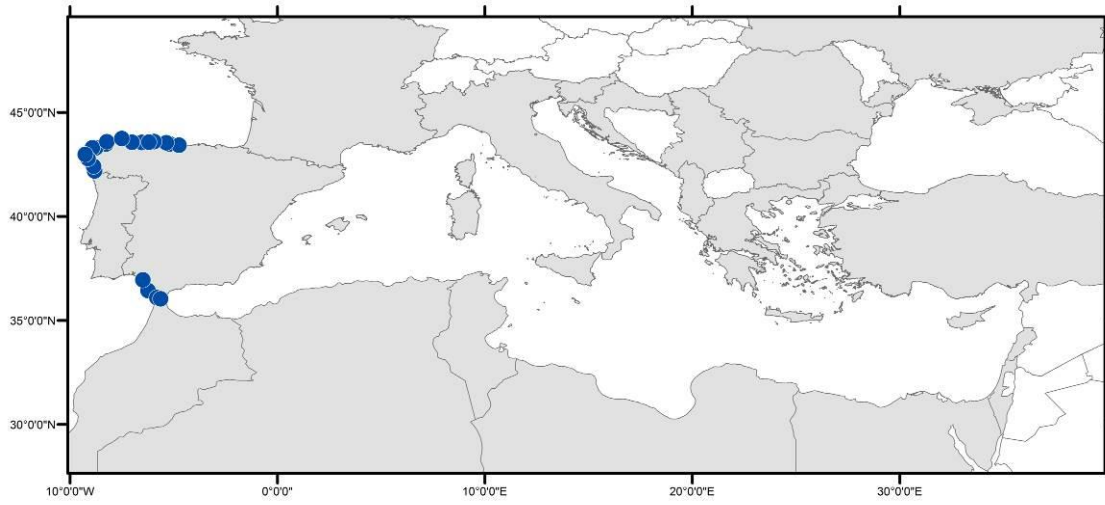


*Ziphius cavirostris*

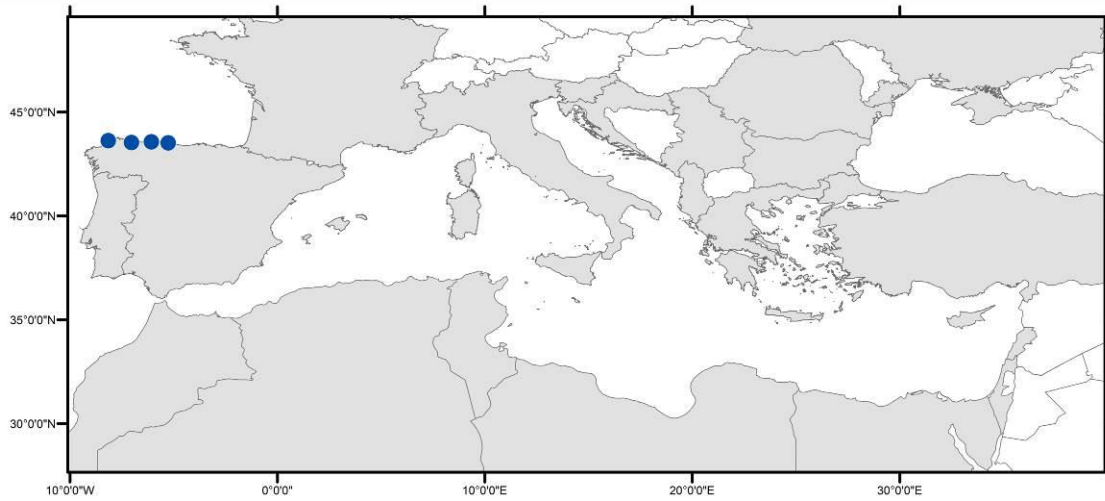




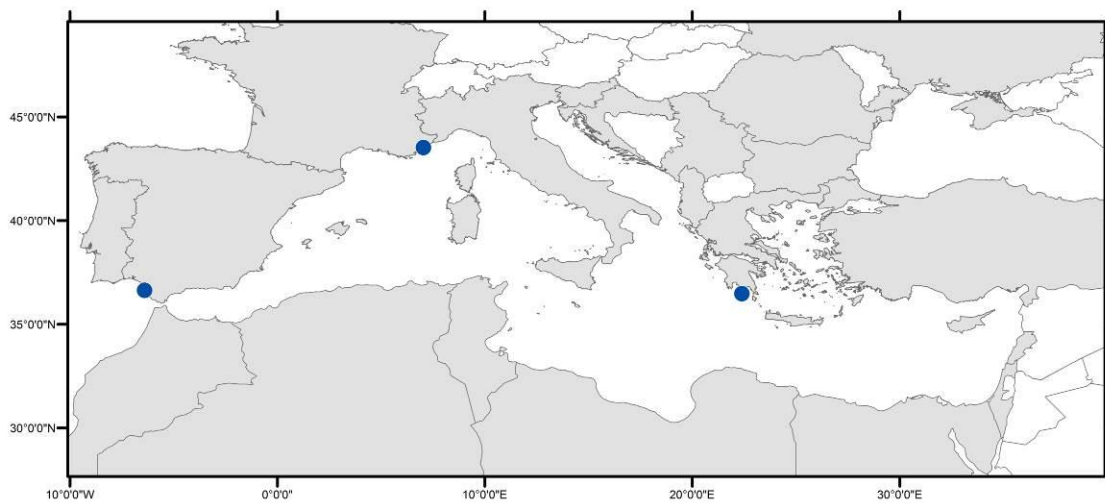
*Kogia breviceps*



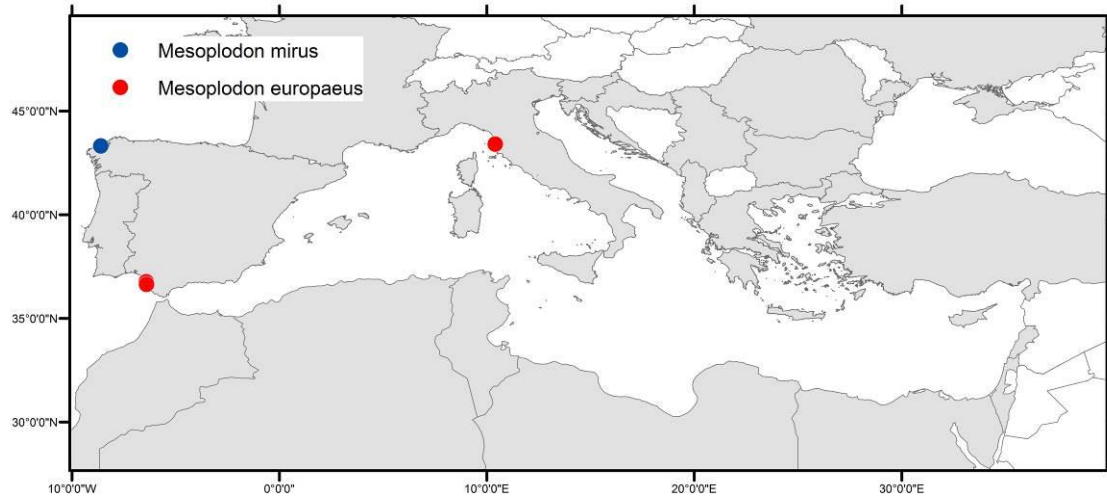
*Lagenorhynchus acutus*



*Mesoplodon bidens*



*Mesoplodon europaeus/ Mesoplodon minus*



Pinnipeds

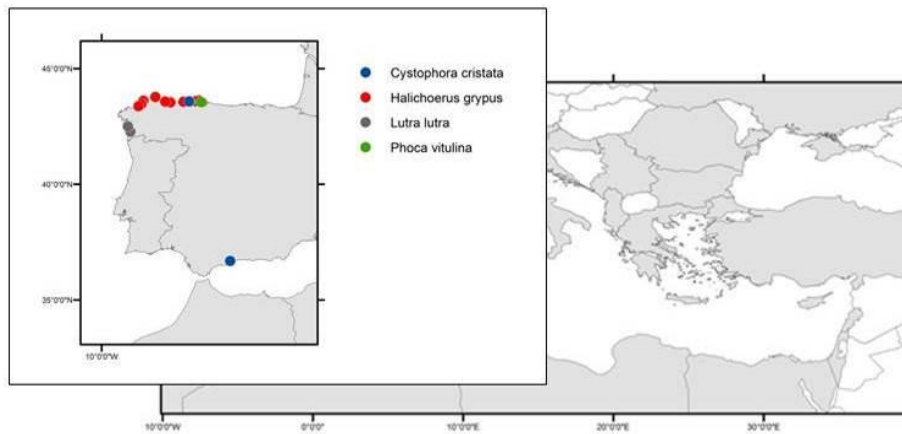


Figure 7. Each of the cetacean species strandings distributed along the coasts of each of the riparian countries of the Mediterranean and Black Seas.

### 2.2.4 Kernel density maps for the most frequent cetacean species

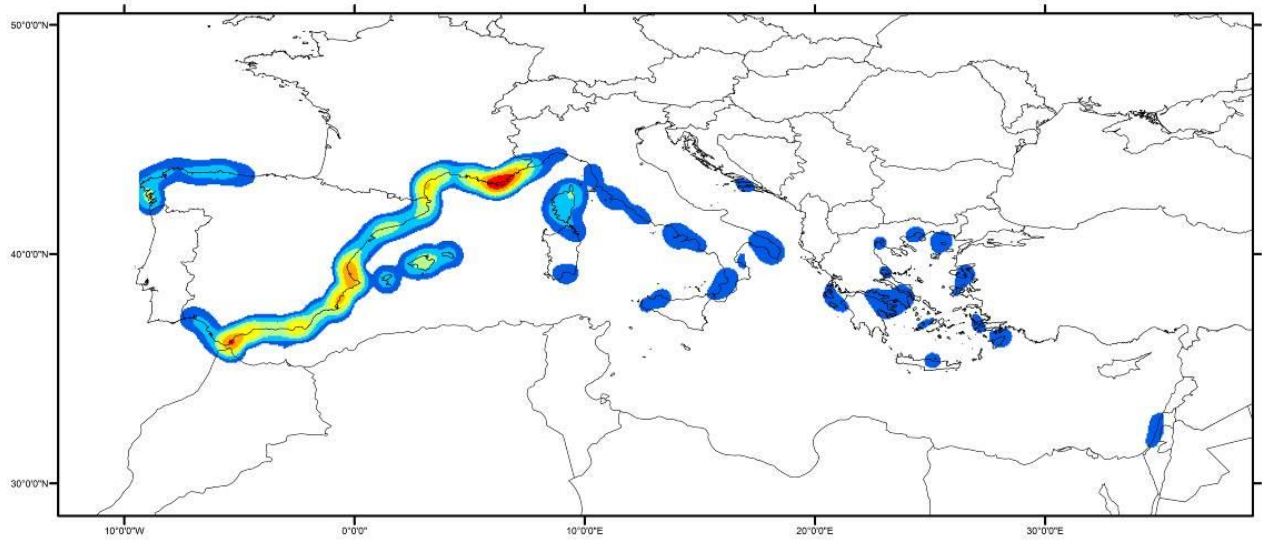


Figure 8. Kernel density map for striped dolphin strandings. Blue: low, red: high

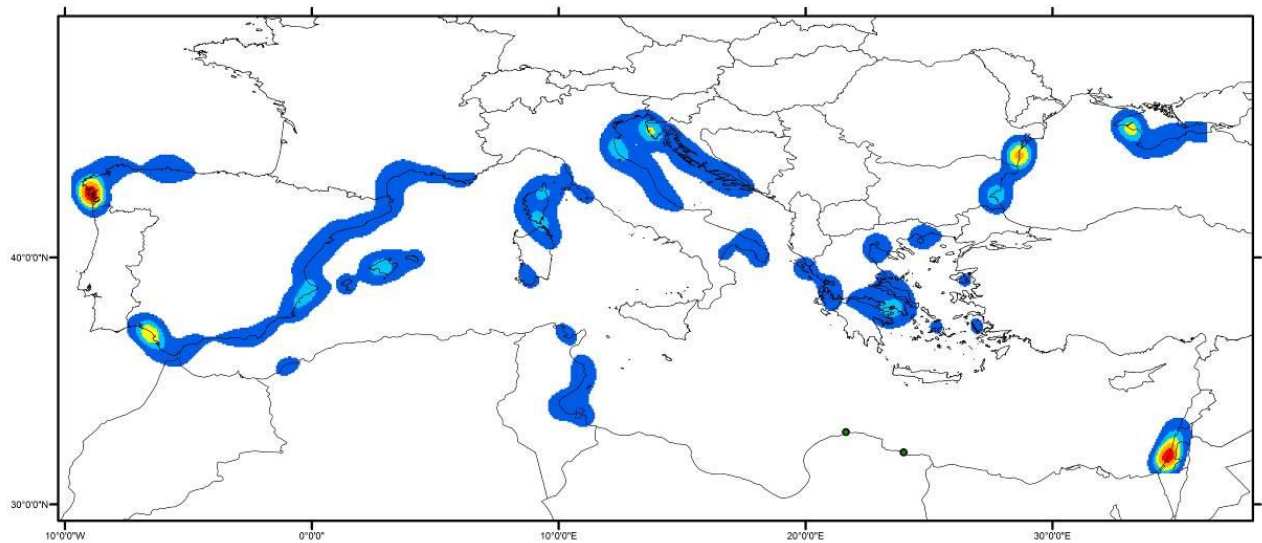


Figure 9. Kernel density map for bottlenose dolphin strandings. Blue: low, red: high

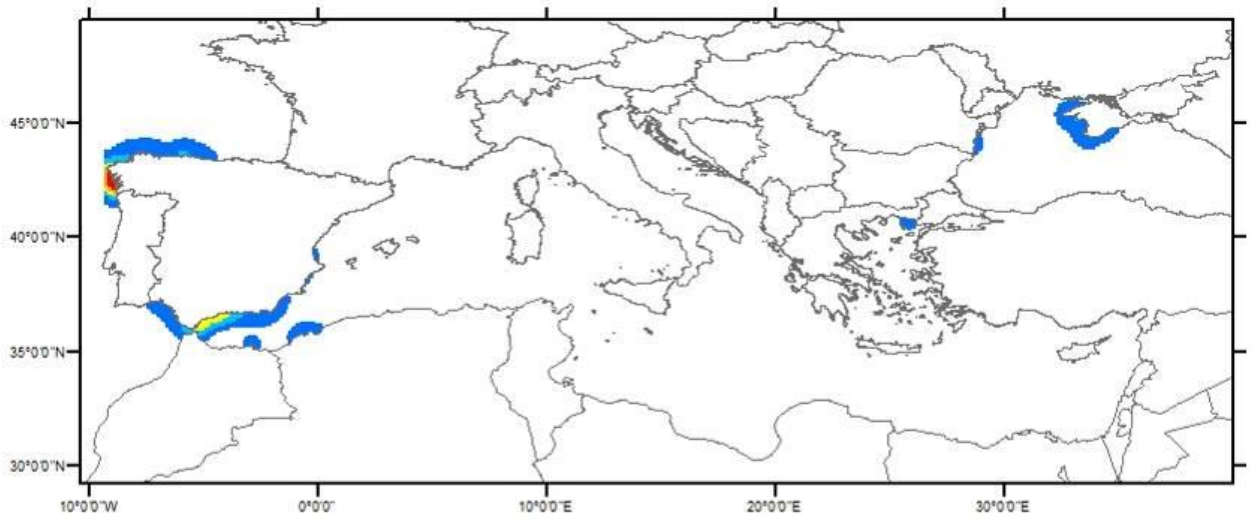


Figure 10. Kernel density map for common dolphin strandings. Blue: low, red:high

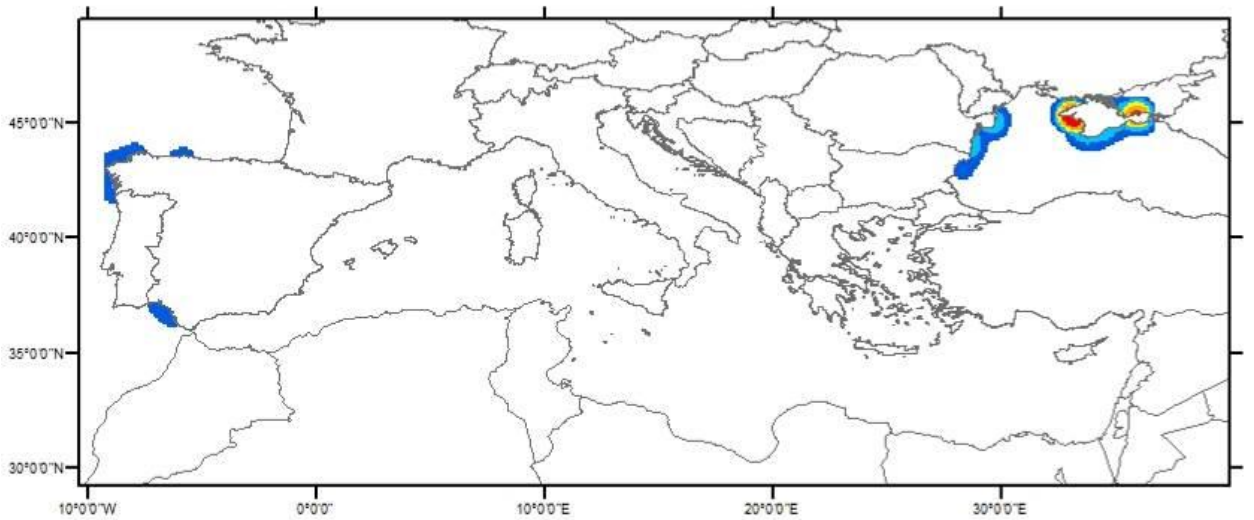


Figure 11. Kernel density map for harbour porpoise dolphin strandings. Blue: low, red:high

Figures 8 to 11 show hotspots for dolphin strandings, which confirms the cetacean abundance and distribution in these areas.

### **2.2.5. Stranding rate**

The average number of cetacean strandings is  $846 \pm 120$  per year

MEDACES would play an important role in detecting anomalies in the rate of cetacean strandings at the Mediterranean and Black Seas across time. However, this will be only possible if the database is continuously updated with the latest information. To date, MEDACES has not been able to show general trends in the number of strandings, as there are still some gaps in the information. Only Croatia, France, Italy, Israel, and Spain seem to have complete stranding records from 1990 to 2010 in the Mediterranean, and Ukraine, Romania and Bulgaria for the Black Seas.

Table 3 shows the number of cetacean strandings of each species by year. No special trends are shown here.

Table 3. Number of strandings recorded for each cetacean species in all partner countries recorded by year. Ba, *Balaenoptera acutorostrata*; Bp, *Balaenoptera physalus*; Dd, *Delphinus delphis*; Gg, *Grampus griseus*; Gm, *Globicephala melas*; Ks, *Kogia Sima*; Md, *Mesoplodon densirostris*; Mn, *Megaptera novaengliae*; Oo, *Orcinus orca*; Pc, *Pseudorca crassidens*; Pm, *Physeter macrocephalus*; Pp, *Phocoena phocoena*; Sb, *Steno bredanensis*; Sc, *Stenella coeruleoalba*; Tt, *Tursiops truncatus*; Zc, *Ziphius cavirostris*, O, others; U, unknown.

	BA	BP	DD	GG	MN	GM	KS	MD	MN	OO	PM	PC	PP	SB	SC	TT	U	ZC
2000	2	19	147	16	0	21	0	0	0	0	12	0	13	0	136	102	113	10
2001	7	7	126	22	1	20	0	0	0	0	12	1		1	192	198	133	14
2002	4	21	224	28	0	23	1	1	1	1	11	0	17	7	219	144	159	16
2003	11	10	224	17	0	20	1	1	0	0	8	10	19	2	309	151	169	7
2004	11	10	234	16	0	29	0	0	3	0	16	1	24	2	249	167	207	7
2005	12	15	249	27	0	43	0	0	0	1	22	12	0	0	218	187	207	16
2006	3	12	186	16	0	56	0	0	0	1	15	0	107	1	209	122	160	16
2007	4	18	138	18	0	60	0	0	2	1	16	2	23	0	416	115	207	11
2008	10	9	224	21	0	34	0	0	0	0	9	0	42	1	346	130	172	9
2009	3	9	201	20	0	30	0	0	0	0	11	7	32	0	266	92	66	5
2010	4	8	120	6		13	0	0	1	0	9	0	89	1	255	98	66	6
2011	2	7	169	16	4	14	0	1	0	0	8	0	110	0	296	102	71	4
2012	9	12	164	11	19	2	0	0	2	0	6	3	219	0	187	145	11	6
2013	6	8	258	8	0	19	1	0	0	0	7	1	83	1	117	150	82	4

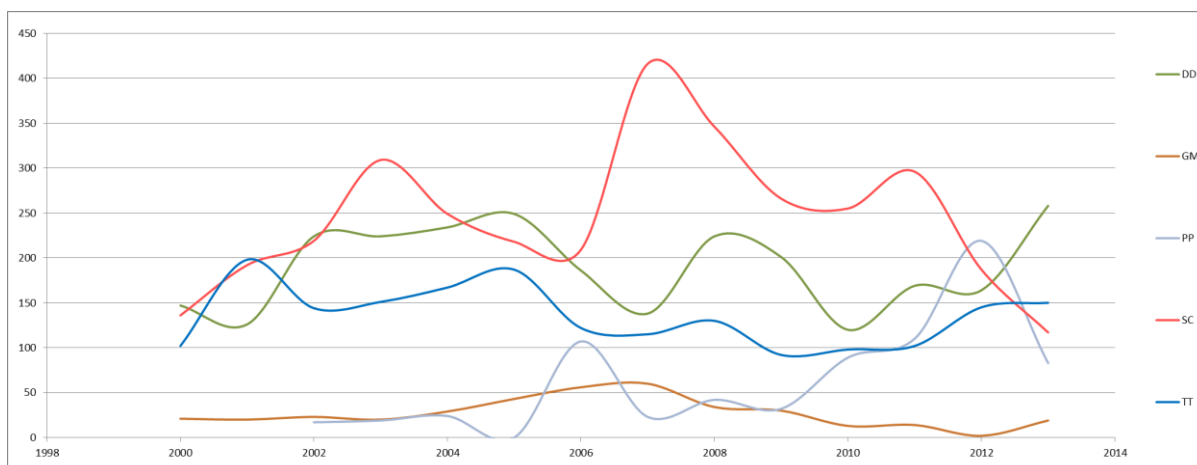


Figure 12. Trends in the number of strandings of the main cetacean species present in the ACCOBAMS area.

Even though the total number of strandings does not show trends along time due to the lack of data in some years, there are some relevant points that could be extracted from these stranding rates in the Mediterranean presented in table 3 and Figure 12:

- The number of Unknown cetacean species has decreased, probably due to the use of new technologies in the identification of the species carcasses by pictures.
- The majority of the species show a constant pattern of strandings along the years.
- The number of striped dolphin stranded was significantly higher in 2007 and 2008, due to the mortality caused by the Morbillivirus infection, and this number seems to be decreasing, reaching numbers before 2007 mortality.
- The number of common dolphins and harbour porpoises strandings varies significantly along the years. Great number of these data is associated to the by catch in these two species in the Black Sea. Since these data does not respond the biological factors and should be considered independently to the stranding data. Anyway, special attention should be paid to this fact.
- The number of pilot whale strandings showed an increase in 2007 and 2008, due to the mortality caused by the Morbillivirus infection, and is decreasing nowadays.



### 3. COMMENTS/RECOMMENDATIONS

- The MEDACES web-page plays a very important role towards the achievement of the following objectives: 1) To collect the stranding information of cetaceans from all the collaborating countries in a unique database; 2) To provide access to the different information that has been collected from each stranded animal; 3) To facilitate the contact information among people and institutions working on cetacean biology and conservation at the Mediterranean and Black Seas. The database joins also information about the organizations/institutions collaborating with MEDACES, including data of contact-persons. Hence, MEDACES makes the cetacean stranding information available to everyone interested in cetaceans (although submitted data are protected by a Deontological Code).
- During 2013, MEDACES has been updated with the data sent by different institutions.
- The way of sending data to MEDACES has been further developed in the last years. More simple data forms have been used in order to make easier the collection of data from the different institutions.
- In every riparian country wishing to collaborate, the different National Focal Points should increase the support to the national organizations and institutions working in stranding networks. This should be conducted through the RAC/SPA or/and ACCOBAMS.
- Data collection could be more effective if data was requested by ACCOBAMS or RAC/SPA coordinators rather than by MEDACES managers.
- Abnormal stranding rates in the Mediterranean in recent years. Several species has been affected: striped dolphins, common dolphins, harbour porpoises and bottlenose dolphins. It would be very interesting to follow up on these observations in order to test for possible infections or an increase in human interactions.
- The fact that this kind of events can be reflected through the MEDACES web page is an opportunity for scientists as well as for competent members of the different governments of the riparian countries, for setting up an emergency protocol to anticipate a possible die-off. In addition, standardized methods for necropsies and



tissue sampling, as well as coordination procedures can be prepared. MEDACES is also providing contact information about relevant scientists and institutions, allowing fast and easy exchange of experience, and advices.

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