2.5 COASTS AND MARINE ENVIRONMENT

The unique geographic positions of the Iberian Peninsula and its two archipelagos confer an exceptional biological and geological legacy upon Spain's coasts and marine environment, which comprise approximately 10,000 km of coastline and almost 1,000,000 km^2 of marine area under Spanish sovereignty and jurisdiction. This extensive area consists of two distinct regions — the Atlantic region (Peninsular and Macaronesian) and the Mediterranean region — which host a degree of biodiversity worth preserving and protecting for its biological uniqueness and wealth. Within these two regions, some of the most noteworthy areas include the Cabrera Archipelago, the Menorca Channel, the Alboran Sea, the Strait of Gibraltar, the Galician Bank, the canyons of Cap de Creus and Avilés and El Cachucho, among others.

Maritime activities have historically played a prominent role in Spain's economy and provided the foundations for the country's development. In addition to fishing (see Chapter 2.10), various emerging uses and activities need to be taken into account alongside others that, while still significant, now have relatively less economic importance. Nevertheless, without proper management, any and all of these may affect the environmental assets that comprise Spain's marine heritage.
Examples of human uses and activities that may

directly or indirectly affect the quality and state of marine ecosystems include maritime traffic and transport, exploration and exploitation of the seabed and marine subsoil, pleasure boating, sun-and-sea tourism, renewable energy (wind, tidal and wave power), marine bioprospecting, number of moorings in ports, etc.

Forecasts of the potential adverse effects produced by these activities, as well as the negative impacts already known and associated with traditional activities, in addition to those resulting from global changes, have led to introduction of new policies aimed at protecting and preserving the marine environment.

This concern for preserving the seas is at the top of the international political agenda. As a result, today the main challenges in this respect are addressed by a new Integrated Maritime Policy and European legislative provisions on the

INDICATOR	GOAL	TREND
Marine biodiversity: protected marine areas	Preserve the natural wealth of the marine environment	Spain has shown a positive attitude to protecting the marine environment and this is likely to increase substantially in the future
Artificial reefs	Protect and regenerate ecosystems and fishing resources	Increase in the number of reefs installed in Spanish waters
Jellyfish swarms	Monitor the presence and number of jellyfish in coastal areas	As the historical series is very short, it is not possible to identify a clear trend in sightings

protection of marine, coastal and transitional waters. The Water Framework Directive (2000/60/EC) and the Marine Strategy Framework Directive (2008/56/EC) form the regulatory framework put in place to ensure the healthy state of the marine environment and therefore provide the guidelines to follow over the next few years.

The result of these Community-level policies is reflected at a national level in the new impetus given to sustainable management through programmes associated with protection of the coastline and management of the publicly owned shoreline, which strengthen measures introduced to preserve marine species and areas. This willingness is evident, on the one hand, in the transposition into Spanish law of the Marine Strategy Framework Directive by the future Marine Environment Protection Law and, on the other, in Law 42/2007, on natural heritage and biodiversity. These instruments establish the principles and basic tenets of sustainability and contribute towards rational use of resources and the marine environment.

Monitoring of the state of the environment is performed via a set of specific indicators, which are adjusted to the dynamic character of the marine environment and its populations and are managed and co-ordinated so as to reflect the activities that take place within it. These tools will help to achieve the goals set by the Directives designed to conserve the natural environment and maintain marine waters and ecosystems in a healthy state.

Marine biodiversity: protected marine areas

Spain has approximately 1,335,378.30 ha of protected marine area

PROTECTED MARINE AREAS IN SPAIN BY PROTECTION CATEGORY (2009)

		NUMBER OF MARINE AREAS COVERED BY MORE THAN ONE PROTECTION CATEGORY									
Total number		NP	SPAMI	SCI	SAC	SPA	OSPAR	RMIP	WHC	MAB	RAMSAR
NP	2	**2**	1	3	–	2	1	–	0	–	–
SPAMI	9	1	**9**	8	–	3	–	4	0	1	1
SCI	68	1	6	**68**	–	27	2	5	1	5	12
SAC	27	–	–	–	**27**	3	–	3	0	4	1
SPA	32	1	3	29	3	**32**	1	4	1	6	10
OSPAR	2	1	–	4	–	2	**2**	–	0	–	–
RMIP	10	–	4	6	3	4	–	**10**	0	4	–
WHC	1	0	0	1	0	1	0	0	**1**	1	1
MAB	11	–	1	8	9	6	–	4	1	**11**	4
RAMSAR	21	–	1	15	1	10	–	–	1	4	**21**

Source: Biodiversity Database. MARM. Spanish Marine Reserves, MARM.

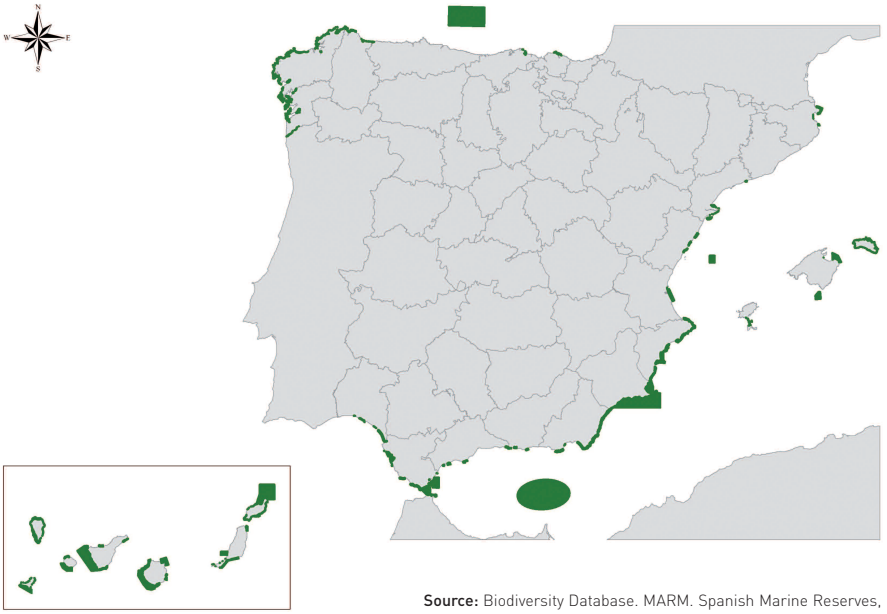
AREA (HA) OF PROTECTED MARINE AREAS IN SPAIN BY PROTECTION CATEGORY (2009)

			MARINE AREA COVERED BY MORE THAN ONE PROTECTION CATEGORY (Ha)									
	Total area (ha)	Marine area (ha)	NP	SPAMI	SCI	SAC	SPA	OSPAR	RMIP	WHC	MAB	RAMSAR
NP	18,627.3	**16,130.4**	**16,130.4**	8,761.0	3,702.2	-	1,046.9	7,368.4	-	-	-	-
SPAMI	148,483.5	**96,610.4**		**96,610.4**	82,592.6	-	25,791.4	-	37,178.0	-	12,049.1	13,488.6
SCI	855,608.9	**611,635.1**			**611,635.1**	-	85,861.7	238,654.4	37,127.1	4,961.75	26,526.8	23,055.4
SAC	179,148.6	**178,473.2**				**178,473.2**	696.5	-	5,475.7	-	35,055.5	0.0
SPA	345,148.5	**103,575.5**					**103,575.5**	1,046.9	16,075.8	4,769.44	31,135.2	9,504.0
OSPAR	8,542	**7,368.4**						**7,368.4**	-	-	-	-
RMIP	530,648.7	**526,686.3**							**526,686.3**	-	32,603.8	-
WHC	**76,711.4**	4,962.02								4,962.02	4,942.34	4,962.02
MAB	1,422,145.7	**119,172.6**									**119,172.6**	5,172.4
RAMSAR	162,530.3	**24,555.7**										**24,555.7**

Source: Biodiversity Database. MARM. Spanish Marine Reserves, MARM.

NOTE 1: It is not possible to provide figures for the total number and area of Protected Marine Areas in Spain, as some overlap and are simultaneously included in several different protection categories. For example, Specially Protected Areas of Mediterranean Importance (SPAMI), areas protected under the OSPAR Convention and National Parks are also included in the Natura 2000 network of SCI, SPAs and SAC. Furthermore, in these cases, the area included under each protection category may also differ as, for instance, 100% of an area may be registered as an SCI and only 60% of it as an SPA. In addition, many of these areas are not exclusively marine and also cover terrestrial areas.
NOTE 2: Spain's future Marine Environment Protection Law provides for the possibility of including Marine Reserves in the country's Network of Protected Marine Areas, provided they meet the Network's common criteria.

PROTECTED AREAS COVERING MARINE AREAS 2009



Source: Biodiversity Database. MARM. Spanish Marine Reserves, MARM.

Spain is estimated to have approximately 1,335,378.30 ha of protected marine area comprising the various protection categories referred to above.

NOTES

- Law 42/2007, of 13 December, on natural heritage and biodiversity, introduces a new and highly significant piece of legislation that incorporates international guidelines on conservation of marine biodiversity into Spanish law in the form of Protected Marine Areas. In Spain, in 2007, the Islas Atlánticas de Galicia National Park was added to the network of marine areas established under the OSPAR Convention. Recently, El Cachucho has been proposed as the second area in Spain to be incorporated into the network.
- Furthermore, the Natura 2000 marine network forms an integral part of the Natura 2000 network of biodiversity conservation areas. The goal, as in the case of the terrestrial areas, is to protect European areas in which it is important to conserve i) the natural habitat types listed in Annex I, and ii) the habitats of the species listed in Annex II of the Habitats Directive.
- Marine protection categories also include marine-terrestrial national parks; the Specially Protected Areas of Mediterranean Importance (SPAMI) declared in accordance with the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona, 1976, as amended in 1995); Spain's Network of Marine Reserves, originally created as a fisheries management tool and managed either by the Secretariat-General for the Sea or in partnership with regional governments (management is shared or individual depending on whether the reserves cover solely coastal waters or also include inland waters); World Heritage Sites declared under the Convention concerning the Protection of the World Cultural and Natural Heritage (World Heritage Centre, WHC); Biosphere Reserves (Man and the Biosphere, MAB), UNESCO; and Ramsar Sites designated under the Convention on Wetlands of International Importance (Ramsar Convention).

SOURCES

- Biodiversity Database. MARM. Spanish Marine Reserves, MARM.

FURTHER INFORMATION

- **http://www.marm.es**

Artificial reefs

There are now 133 protective artificial reefs installed in Spanish waters to foster fishery resource regeneration

ARTIFICIAL REEFS MANAGED BY THE SECRETARIAT-GENERAL FOR THE SEA (2009)

	WATER	TYPE			AREA
REGIONAL GOVERMENT	COASTAL	PRODUCTION	PROTECTION	MIXED	(Ha)
Andalusia	8		2	6	18,234.15
Balearic Islands	1		1		2,383.5
Catalonia	4	1	2	1	11,645.53
Murcia	1			1	1,564.00
Valencia	1			1	1,883.60
Cantabria	2		2		11,936.00
TOTAL	17	1	7	9	47,646.78

Source: Secretariat-General for the Sea, MARM.

ARTIFICIAL REEFS MANAGED BY REGIONAL GOVERNMENTS (2009)

	TYPE			TYPE		
REGIONAL GOVERMENT	INLAND	COASTAL	BOTH	PRODUCTION	PROTECTION	MIXED
Andalusia	19	4	2	1	10	14
Asturias	3	2	4	1	6	2
Balearic Islands	9		1	5	5	
Canary Islands	4	2		4		2
Catalonia	12	5		4	3	10
Murcia	7				5	2
Valencia	42			1	11	28
TOTAL	96	13	7	16	40	58

Source: Secretariat-General for the Sea, MARM.

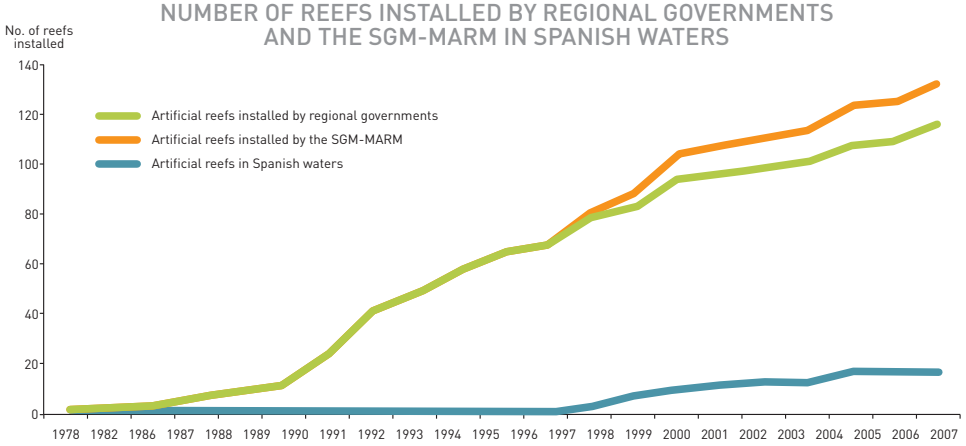
Installation of artificial reefs in Spain dates back to the early 1980s with the installation of the pioneering Escorpora (1981) and Sa Riera-Begur (1982) reefs in Catalonia. Progressive application of the policy throughout the rest of the decade led to installation of 10 new reefs by 1989 — 3 in Catalonia (L´Ampolla, Salou and Medas), 3 in Valencia (Santa Pola, Tabarca and Torrevieja), 2 in the Canary Islands (Tazacorte and Arguineguin), 1 in the Balearic Islands (Cap Regana), and 1 in Andalusia (Conil).

Implementation of this approach in the early 1980s was strengthened by Spain's accession to the EEC. In view of its effectiveness, it became established as a fishery management tool during the 1990s and a total of 93 reefs were installed.

In 1995, the MARM began acting as a direct promoter of this type of initiative under the terms of Law 3/2001, on state marine fisheries. The trend was bolstered by the addition of further reefs at the beginning of the 21st century.

Today, the number of artificial reefs installed to protect habitats of interest to fishing and, therefore, regenerate natural resources, stands at 133.

NUMBER OF REEFS INSTALLED BY REGIONAL GOVERNMENTS AND THE SGM-MARM IN SPANISH WATERS



Source: Secretariat-General for the Sea, MARM.

NOTES

- Artificial reefs are defined in legislation as a set of elements comprising a variety of inert materials and in various forms arranged on a demarcated surface of the seabed. From the point of view of fisheries, an artificial reef is a management tool that protects fishery resources and ecosystems and develops these resources locally by reducing the mortality rate for juvenile fish prior to reproduction by providing food sources for particular species. It also enables reproductive adults to survive in new areas and therefore enhances management of these resources.
- Under Spanish legislation, authorisation and installation of artificial reefs is regulated by Royal Decree 798/1995, as amended by Royal Decree 2287/1998, of 23 October, which defines the criteria and conditions governing actions with structural implications for the fishing and aquaculture sectors and for the sale, marketing, processing and production of their products.
- Direct involvement by the Ministry of the Environment and Rural and Marine Affairs in installing artificial reefs derives from the powers granted by the Constitution in relation to management of marine fisheries in coastal waters. In accordance with the legislation in force, the Ministry of the Environment and Rural and Marine Affairs may establish protected areas outside inland waters for the purpose of protecting, regenerating and developing fishery resources in littoral marine areas. Designation of protected area status is dependent upon a prior report by the Spanish Institute of Oceanography (IEO).
- The Ministry of the Environment and Rural and Marine Affairs has the power to install artificial reefs in coastal waters and waters that are simultaneously both coastal and inland.

SOURCES

- Directorate-General for Fishery Resources and Aquaculture, Secretariat-General for the Sea, MARM.

FURTHER INFORMATION

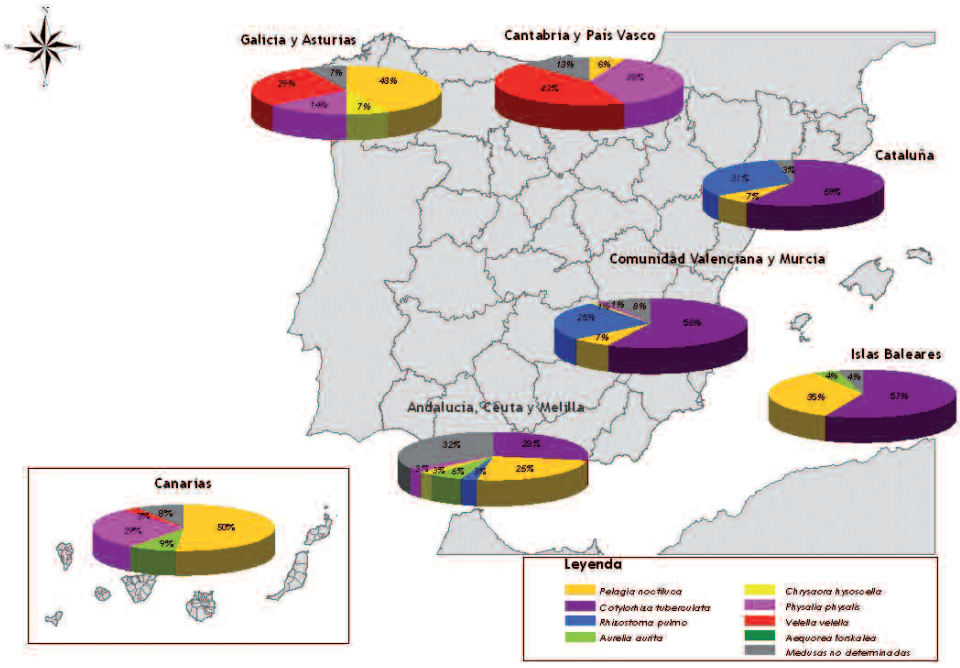
- **http://www.marm.es**

Jellyfish swarms

Although the presence of jellyfish in the sea is a natural phenomenon, in recent years the Spanish coast has been affected by large numbers, usually in the summer

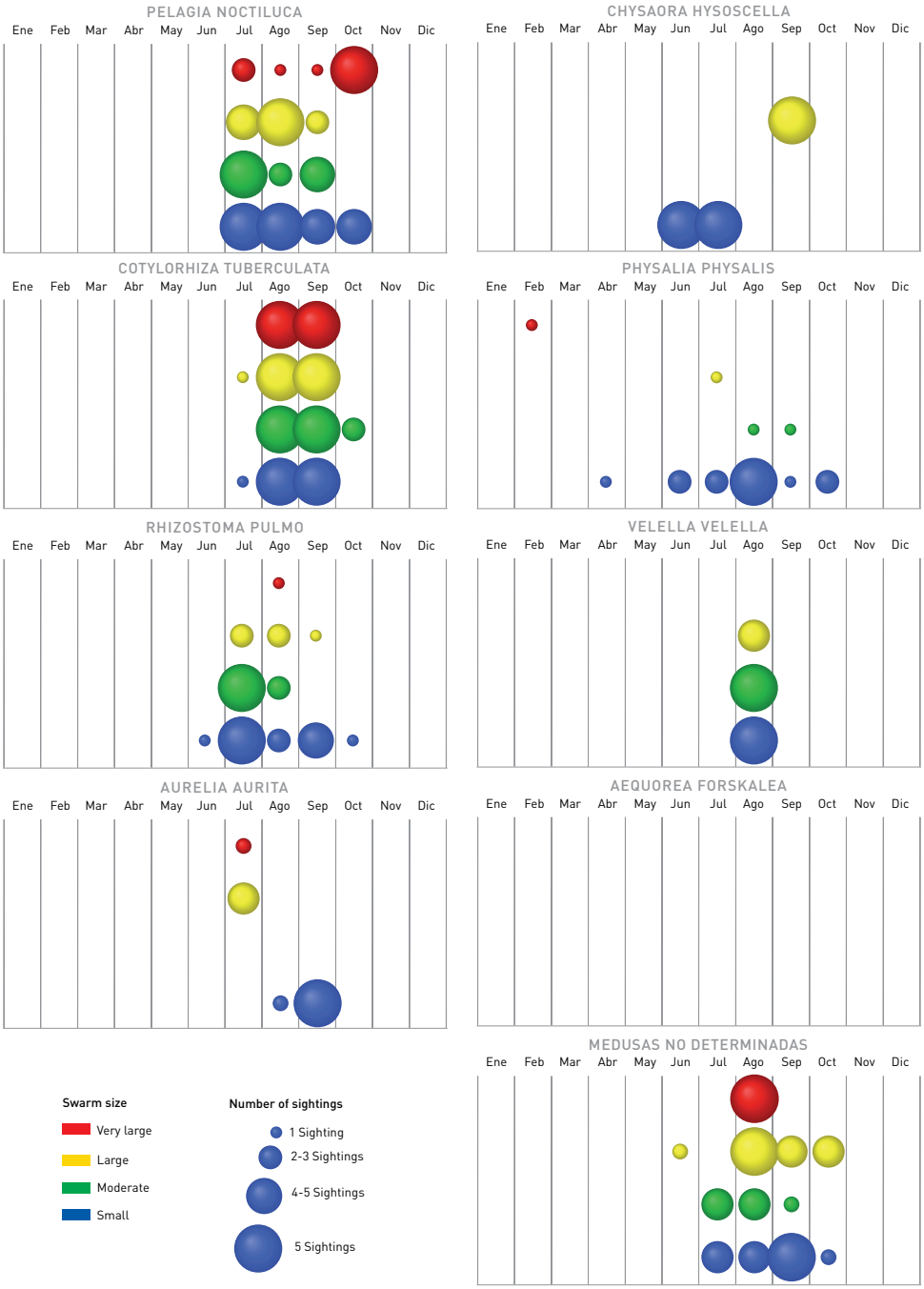
The presence of jellyfish on Spanish coasts may be the result of various species' distribution patterns. Therefore, in order to gain a greater understanding of these swarms, each species' presence in Spanish waters is being assessed individually. Species such as *Rhizostoma pulmo*, *Cotylorhyza tuberculata* and *Pelagia noctiluca* have been sighted on the Mediterranean coast. The latter has also spread to cooler waters and has been observed as far away as the Canary Islands and the Bay of Biscay. Others, such as *Velella velella* and *Chrysaora hysoscella* have been sighted predominantly in the Bay of Biscay. *Physalia physalis*, an inhabitant of tropical waters, has been sighted in the Canary Islands and the Strait of Gibraltar, as well as in the Bay of Biscay.

JELLYFISH DISTRIBUTION IN SPAIN BY SPECIES (2009)



Source: MARM

JELLYFISH SIGHTINGS IN SPANISH WATERS IN 2007, 2008 AND 2009
(Number of sightings and size of jellyfish swarms by species)



Source: Directorate-General for Coastal and Marine Sustainability, MARM.

NOTES

- Greater or lesser numbers of sightings should not be taken as an indicator of higher numbers of jellyfish. Rather, as sightings depend on a multitude of variables, such as number of observers, number of sightings confirmed, seasonal campaigns, etc., they merely indicate trends in the number of confirmed sightings.
- Jellyfish numbers should be considered in relative terms because of the subjectivity of the observers reporting the sightings.
- In order to determine the true scale of the problem of proliferating numbers of jellyfish in Spain's coastal waters, since 2007 the Ministry of the Environment and Rural and Marine Affairs has run an annual monitoring campaign each summer. The campaign was restricted to Catalonia, Valencia, Murcia, Andalusia, Ceuta-Melilla and the Balearic Islands in 2007 and 2008, but was extended to cover the entire Spanish coastline in summer 2009.
- The campaign's objectives include detection of jellyfish swarms and floating residues and reporting of sightings to a central node. Participation by a network of observers has played a key role in detecting and reporting the presence of jellyfish in coastal and offshore waters during the summer season.
- Information concerning sightings reported by observers can be consulted using the viewer available on the campaign's website and on the home page of the Ministry of the Environment and Rural and Marine Affairs. Users can consult species sightings by date, number and coastal area.

SOURCES

- Directorate-General for Coastal and Marine Sustainability, MARM.

FURTHER INFORMATION

- **http://www.marm.es**
- **http://www.planmedusas.es**