



Analysis of Mediterranean marine environment protection: the case of the Pelagos Sanctuary

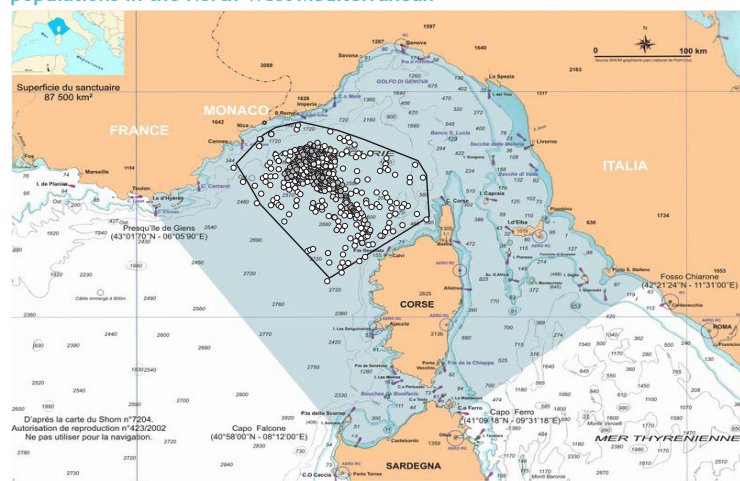
The Mediterranean is one of the planet's 25 biodiversity hotspots. Although it represents only 0.7% of ocean surface area, it is one of the major reservoirs of marine and coastal biodiversity, and includes about 7.5% of the world's known marine fauna and 18% of the world's marine flora (28% are endemic). This biodiversity is severely threatened, in particular by climate change and constantly increasing anthropic pressure, especially in coastal areas where high demographic and socio-economic densities lead to pollution and damage to natural habitats. Following the recommendations of the Convention on Biological Diversity for halting biodiversity degradation, Mediterranean rim countries have made a commitment to create and strengthen Marine Protected Areas, which aims at protecting biodiversity and promoting sustainable use of marine resources and environments. Plan Bleu strives to enlighten such commitments toward sustainable development, in this case specifically by shedding light on the uses of services provided by the ecosystems and on the effects of marine and coastal ecosystem conservation through a socio-economic approach. Plan Bleu has therefore performed an analysis of the effects of the Pelagos Sanctuary on sustainable development and maritime activities.

The role of the Pelagos Sanctuary

The Pelagos Sanctuary for Mediterranean Marine Mammals preservation is located in the northern Mediterranean and covers a surface area of 87,000 km² from the French and Italian coastlines to the north of Sardinia (Figure 1). This area, which offers habitat for a wide variety of species that

are complementary to cetaceans, attracts both resident and migratory cetaceans. The most numerous cetacean species observed are the fin whale (*Balaenoptera physalus*), with 3500 individuals counted, and the striped dolphin (*Stenella coeruleoalba*), whose population count is 20-30,000 individuals.

Fig. 1 : Boundaries of the Pelagos Sanctuary and the distribution of cetacean populations in the North-West Mediterranean



Note: The gathering area for marine mammals was defined during the summer seasons (June to October) from 1990 to 1999, using approximately 500 observations from the North of Corsica. The boundaries of the Pelagos Sanctuary are shown by the two diagonal lines joining Sardinia to France and Italy. Sources : Panigada et al., 2005, In Notarbartolo-di-Sciarra et al., 2008
<http://www.sanctuaire-pelagos.org/telechargements/index.php?th=5&id=42>

Although the Mediterranean offers favourable habitats for cetaceans, certain species are still vulnerable. Among the nine cetacean species regularly observed in the Mediterranean and in the Pelagos Sanctuary, the killer whale (*Orcinus orca*) is listed by the International Union for Conservation of Nature (IUCN) as a critically endangered species, the sperm whale (*Physeter macrocephalus*) and the short-beaked common dolphin (*Delphinus delphis*) are listed as endangered species and the common bottlenose dolphin (*Tursiops truncatus*) and the striped dolphin (*Stenella coeruleoalba*) are listed as vulnerable. Due to insufficient data means the IUCN has not been able to assign a category to the four other species.

The establishment of the Pelagos Sanctuary in 2002, following the tripartite agreement signed by France, Italy and Monaco in 1999, expresses the commitment of these three states to protecting a common natural heritage, even beyond areas of national jurisdiction.

Indeed, over 50% of the Pelagos Sanctuary is located on the high seas where the only recognised regulatory body is the United Nations Convention on the Law of the Sea.

The role of the Pelagos Sanctuary is to protect the three aspects of biodiversity linked to cetaceans: the marine ecosystems and habitats on which they depend, the various cetacean species and the genetic diversity of these different species, by limiting the environmental impact of human activities. The Pelagos Sanctuary has been recognised as a Specially Protected Area of Mediterranean Importance (SPAMI) for biological diversity under the Barcelona Convention Protocol.

The effects of the Pelagos Sanctuary on socio-economic activities

Plan Bleu has studied the effects of Pelagos protection measures and efforts to reduce environmental impacts by enlightening their socio-economic impact on activities within the Sanctuary.

Pelagos is developing two complementary actions that target the adoption of behaviours that better respect cetaceans and the marine environments. Firstly, it contributes to the acquisition and dissemination of knowledge about cetaceans, by directly funding research work, by promoting scientific cooperation (such as GIS3M, a scientific interest group for Mediterranean marine mammals), by maintaining a cetacean population monitoring network and by participating in or supporting public awareness-raising activities.

Secondly, Pelagos facilitates the implementation of regulatory systems by promoting dialogue between the various socio-economic stakeholders, such as private operators, researchers and public bodies. Pelagos holds discussion forums where stakeholders are invited to present their issues regarding the reduction of environmental impacts and to take part in building common solutions.

This stakeholder-coordination process aiming to develop cooperative behaviours that better respect cetaceans and the marine environment, could have a direct influence on socio-economic activities inside the Sanctuary. However, this process runs into certain difficulties as some of the activities involved play a key role in the dynamism of the local economy.

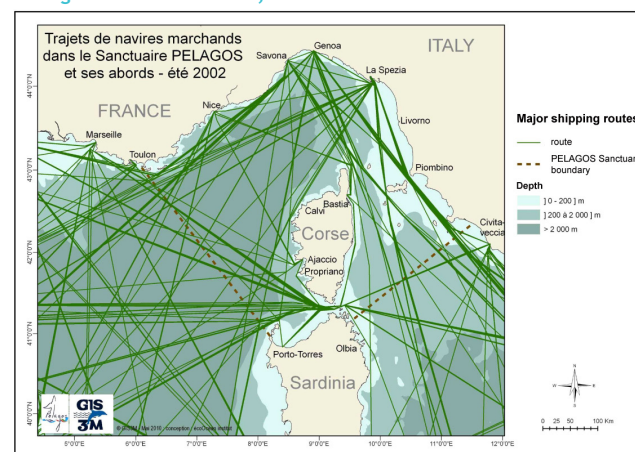
The main local marine related economic activities, their environmental impacts and the targeted Pelagos measures

The French, Monacan and Italian coastlines, which border the Pelagos Sanctuary, are characterised by high-levels of urbanisation counting about 8 million inhabitants and intensive tourism. In 2009, the Provence-Alpes-Côte-d'Azur region in France and the Principality of Monaco welcomed 7 million foreign visitors, while population density and industrial activity are both increasing on this part of the coastline. Despite socio-economic activities on the coastline can cause background pollution or disturb coastal ecosystems, most environmental impacts that affect cetaceans are due to activities at sea.

Shipping: strategic issues and collision

There is highly intensive marine transport (of goods and passengers) within the Sanctuary due to the numerous shipping routes and the volume of business generated (*Figure 2*). Most goods carried through the Pelagos Sanctuary are energy commodities (oil and gas) intended for Italian ports. In 2006, the transport of hydrocarbons through the Pelagos Sanctuary generated a revenue estimated by Plan Bleu at over €10,5 billion, corresponding to 205 million barrels of oil and over 90 million Btu of gas (Lloyd's Marine Intelligence Unit, 2008).

Fig. 2: Shipping routes for commercial vessels (goods and passengers) during the summer season, 2002



Source: Based on Di-Méglio et al., 2010

With regard to passenger transport, the most frequently used routes within the Sanctuary connect the islands (Corsica and Sardinia) with France and Italy. The number of ferries has increased by approximately 29% in eight years. In 2009, the turnover reached nearly €388 million during the low season and over €1,600 million during the high season (Plan Bleu estimation).

Marine transport, whether of goods or passengers, exposes marine mammals to acoustic and behavioural disturbances that can lead these animals to change their path, modify their migration routes or interrupt their feeding period, and can even lead to collisions with vessels, collisions which are often fatal for the cetaceans. Dense shipping activity also leads to an increased risk of pollution, in particular accidental pollution. In 2000, to combat these environmental impacts, Pelagos launched a development programme that led to the implementation of a cetacean monitoring system, REPCET. This is a network for real-time sharing observations of cetaceans reported on shipping routes. This tool provides navigational assistance to help the captains of vessels to anticipate the presence and paths of cetaceans.

Fishing: traditional practices and the survival of marine mammals

Commercial fishing is an important economic activity in the Pelagos Sanctuary, with revenues estimated at over €60 million in the area, mainly concerning the Italian fleet (*Figure 3*).

Fishing has direct and indirect impacts on cetaceans. Firstly, they may be accidentally caught in nets when fishing for pelagic species. Secondly, over-fishing, the destruction of

deep-water habitats and tuna feeding practices contribute to reducing cetaceans' food supply, threatening both the diversity of cetacean species and the number of individuals per species, and contributing to the destabilisation of the rest of the food chain.

Fig. 3: Statistical and economic data for fishing in Liguria, Tuscany and Italy as a whole in 2008

	Number of fishing vessels	Number of fishermen	Catch size (tonnes)	Revenues (millions €)
Liguria	553	1074	3787	34
Tuscany	626	1094	6194	37
Italy	13374	29562	216567	1082

Note: Approximately 90% of the fishing fleet of the adjacent regions, whether in France (PACA) or Italy (Liguria and Tuscany), fish inside the Pelagos Sanctuary.

Source: Italian agricultural research agency (ISMEA), 2009

The main risk for cetaceans comes from high-sea fishing, in particular tuna driftnet fishing, which has both direct and indirect impacts. For tuna driftnet fishing alone, GECM (a French study group on Mediterranean cetaceans) estimates the risk of cetacean accidental by catch at around a hundred individuals annually. From 2004, in the framework of the special French fishing permit, Pelagos developed a tuna driftnet fishing charter, to maintain this traditional fishery in an environmentally sustainable way. Despite the provisions made, France was condemned by the European Court of Justice in 2009 because this fishing contravenes the 2002 EU ban on the use of driftnets.

Tuna driftnet fishing is not the only threat to cetaceans and other discussions have been opened between Pelagos and fishing stakeholders, in particular with regard to fishing areas, seasons, techniques and equipment, to reduce accidental by catches and food chain degradation.

Risks of disturbance and pollution from recreational activities, infrastructure development and other marine related activities

Whale watching (sea-going excursions to observe whales and marine mammals in their natural environment) is the main commercial recreational activity practiced in the Pelagos Sanctuary. In 2005, there were 22 French whale-watching operators, which ran trips for approximately 5000 passengers. On the Italian side, the activity is larger but more concentrated with only 4 operators transporting about 16,000 passengers in 2005. Overall, whale watching generates revenues of approximately €1 million annually.

With regard to this activity, which has been growing since the Pelagos Sanctuary was founded (60% increase in the activity in France from 2005 to 2009), the Sanctuary has been working hard with operators and various partners from an early stage. In 2002, this work led to the definition of a Code of Good Practices, which in turn led in 2007 to the development of a label for whale watching operators, in collaboration with ACCOBAMS¹, which would initially

¹ ACCOBAMS (Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Atlantic Area) is a cooperative system for conserving marine diversity and migratory species in the area. The aim of this agreement is to reduce the threats to cetaceans and improve our knowledge of these species. <http://www.accobams.org>

apply to the Pelagos Sanctuary and later to the whole Mediterranean basin (including the Black Sea).

High-speed motorboat races (or offshore races) are officially banned in the Pelagos Sanctuary, but are sometimes allowed under dispensation. Industrial developments at sea, offshore exploration and military exercises are all pollution risks for cetacean habitats and sources of acoustic disturbances.

Assessing the effects of the Pelagos Sanctuary on marine related activities

The effects of the measures implemented by the Pelagos Sanctuary are still hard to observe. With respect to most of the disturbance prevention measures, such as the REPCET system, the quality label for whale watching or the ban on offshore races, the small amount of data available to date argues in favour of strengthening these initiatives and improving compliance. For example, despite the common ban, dispensation are given every year authorising offshore races inside the sanctuary.

The label for whale watching gives whale-watching operators the opportunity to offer more educational and sustainable services; however, the training sessions required for operators to obtain the certification only started in 2011. The qualitative and quantitative effects of this certification will therefore only be observable several years from now.

Finally, the REPCET system, which aims to prevent collisions between commercial ships and cetaceans, has been in the testing phase with five ship owners since 2010, and by the end of 2011 the number of vessels fitted out should be multiplied sixfold. The use of this system will be increasingly effective as the number of users grows, since the available data is produced collaboratively.

To enhance their effectiveness, the measures undertaken by Pelagos now require greater commitment from the various stakeholders. On the one hand there are the private operators who could rally to the cause of marine mammal protection in the context of their activities by implementing inexpensive systems that provide a competitive advantage or economic efficiency (such as marketing assets or lower repair costs).

On the other hand, there are signatory States who could strengthen regulations for activities at sea, both within waters under national jurisdiction and beyond national jurisdictions, by firstly applying the declarations and initiatives taken within the Pelagos framework and then extending these measures to the practices of ships of all flags operating inside the Pelagos Sanctuary.

Furthermore, with the hope of strengthening regulations within the Pelagos Sanctuary and extending the rules to ships of all flags crossing the area, Pelagos has made a commitment to the national authorities to file, during 2011, a request to be recognised as a Particularly Sensitive Sea Area (PSSA) by the International Maritime Organization. This status, based on recognition of the scientific, socio-economic or ecological importance of the area and its vulnerability in the face of proven or potential damage from international maritime activities, would allow rules of conduct to be established for ships of all flags, even outside waters under national jurisdictions.

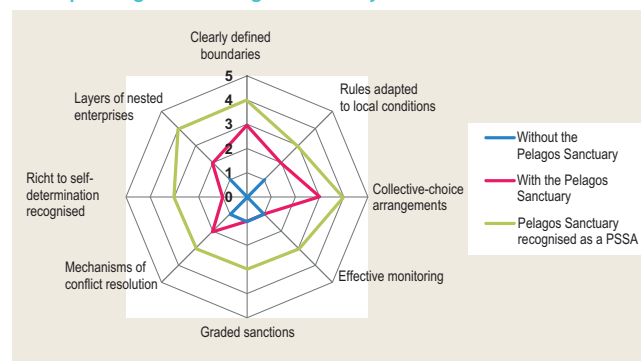
As an illustration, the advantages of the recognition of a PSSA have been evaluated using the work of Elinor Ostrom (Nobel Prize in Economics 2009) in the field of the economics of institutions and the 8 key principles for the stability of institutions that aim to manage ecological services in an adequate and sustainable manner (Box and Figure 4).

Elinor Ostrom's eight key principles for stable institutions

- The boundaries of the environmental asset and the users addressed by the institution must be clearly defined.
- The rules laid down by the institution must be adapted to local conditions.
- The institution's decision-making process must be established and applied.
- Compliance with the rules must be monitored.
- A scale of graduated sanctions must be applied to those who break the rules.
- Conflict resolution mechanisms must be effective.
- The self-determination of the institution must be recognised by the authorities.
- There must be multiple layers of nested enterprises at various scales.

In conclusion, as shown in Figure 4, the measures implemented by Pelagos have enabled progress towards regulation of uses, to limit the environmental impacts of marine related activities that affect cetaceans. However, without the cooperation of the other State institutions that regulate activities, such as the maritime authorities of France, Italy and Monaco, the legislative frameworks of these countries and without the cooperation of private stakeholders, the efforts undertaken by Pelagos cannot produce the necessary behavioural changes. The commitment of the public and private bodies that structure marine related socio-economic activities must be made more explicit. The recognition of the Sanctuary as a PSSA may facilitate and enhance clearer and smoother relationship between the competent authorities of the States around the Sanctuary and the establishment of rules of conduct that apply to ships of all flags that enter the area.

Fig. 4: Illustration of the effects of regulation in the area corresponding to the Pelagos Sanctuary



Note: Qualitative assessment performed by Plan Bleu on the basis of a literature survey and interviews with stakeholders in Pelagos Sanctuary governance and measures implemented by Pelagos. The scores given here represent the synthesis of the perceptions expressed by the various stakeholders and are given for illustrative purposes. Source : Plan Bleu, 2011, on the basis of the 8 key principles of E. Ostrom on the basis of Elinor Ostrom's eight criteria and for various regulation scenarios

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