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**Alfred Toepfer Natural Heritage Scholarchip 2011**

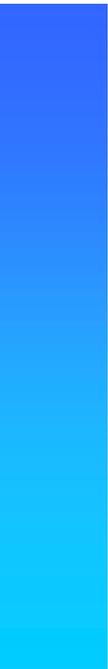


## **Marine Protected Areas in the Mediterranean Sea**

**Awarded on the EUROPARC Conference 2011 in Bad Urach,  
made possible by the Alfred Toepfer Stiftung F.V.S.**



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## Acknowledgements

First of all I would like to thank the Alfred Toepfer Foundation and the EUROPARC Federation for giving me the unique opportunity to work on this project. I met many interesting and very motivated people all over Europe, I visited many marine protected areas (MPA's) and I learned tremendously about marine conservation in the Mediterranean Sea.

I would also like to thank all people, national parks, marine reserves, marine Natura 2000 sites and/or marine protected areas who were willing to receive me and cooperate with this project. I would like to thank in particular the Gibraltarian Ministry for Environment, the Spanish Ministerio de Medio Ambiente y Medio Rural y Marino (MARM) – Secretaria General del Mar (SGM), TRAGSATEC and its employees at Isla de Tabarca and Cala Ratjada, the Parque Naturel de Ses Salines, the Parque Nacional del Archipiélago de Cabrera, the Réserve Naturelle Marine de Cerbère-Banyuls, the marine Natura 2000 site Posidonies du Cap d'Agde, ADENA, Parc national de Port-Cros, Parc Marin de la Côte Bleue, the MedPAN Secretary, Parc Marin de Bonifaccio, the Area Marina Protetta Isola di Bergeggi, the Area Marina Protetta Portofino, the Parco Nazionale Arcipelago Toscano, the Area Marina Protetta Isola di Ventotene e Santo Stefano, the Area Marina Protetta Torre del Cerrano, the Nacionalni parc Kornati, Nacionalni parc Brijuni, the Javna ustanova Park prirode "Lastovsko otocje", the Cres-Losinj Dolphin reserve, the Nacionalni parc Brijuni and the Riserva Naturale Marina di Miramare.

A special thanks to the following persons who coordinated my fieldtrips and/or were willing to be interviewed: Mrs. Regina Schöfer, Mr. Stephen Warr, Mr. John Cortes, Mrs. Silvia Revenga, Mr. Pepe Bedoya, Mr. Juan Carlos Jorquera Gámez, Mr. Felio Lonzano, Mr. Javier Llorente, Mr. Jose Amengual, Mr. Jean-François Planque, Mr. Jean-François Laffon, Mr. Renaud Dupuy de la Grandrive, Mr. Sylvain Blouet, Mr. Edouard Chéré, Mrs. Christine Graillet, Mr. Johan Cerisier, Mrs. Marie Romani, Mr. Simone Bava, Mrs. Valentina Cappanera, Mr. Giorgio Fanciulli, Mrs. Franca Zanichelli, Mr. Antonio Romano, Mr. Fabio Vallarola, Mrs. Mila Longcar, Mr. Vladislav Mihelcic, Mr. Zladko Ruzanovic, Mrs. Moira Bursic and Mr. Roberto Odorico.



**Left:** Some of the 10 kg's of promotional materials that were received during the visits, including books, brochures, hats, t-shirts, DVD's, movies, posters, stickers, pencils and pens.

**Right:** Overview of some of the train-, bus-, metro-, ferry- and airtickets that were used during this expedition.

## Introduction

There are currently over 700 marine protected areas in the Mediterranean Sea, from which I visited 15 in Gibraltar, Spain, France, Italy and Croatia. I spoke with conservation managers, rangers, scientists, fishermen, divers and locals, took interviews and explored the different MPA's. Meeting all those motivated and passionate people all over Europe has made me a real optimist with regard to the future of marine protected areas in the Mediterranean Sea. I learned that plenty of experience is present and that many MPA's experience the same challenges and threats. Programmes like the MedPAN network, which focusses on exchange of information between Mediterranean MPA's are thus very usefull. Several MPA's also felt that 'the voice of European nature protection' could be louder and stronger if there would be more communication between marine and terrestrial protected areas in Europe. This could be a great opportunity for the EUROPARC Federation, since only a minority of its members are MPA's or ar dealing with marine issues. EUROPARC and its members also have plenty of experience on management, alternative ways of financing, visitor control, ... which could be very interesting aswell for MPA's. **At the end of this document, a summary table with the visited sites, websites, names and emails of contactpersons, success stories and topics that could be interesting / where advice would be welcome, is provided.**

After sending tens of emails, travelling more then 10,000 km by public transport and shooting 22 gigabytes of movies and photographs, I can present you my final report and movies (<http://www.youtube.com/user/robbertca>) on marine protected areas in the Mediterranean Sea. The first challenge was to get in contact with the MPA's and to find the right persons to contact. I noticed that there is still a language-barrier and that many conservation managers are very busy, and sometimes several emails were necessary to get a first response.

I mostly used public transport to get to the MPA's: 80% of my travelled kilometers were by train, bus or ferry. It is impressive that most of the MPA's can be reached relatively easy by public transport but ofcourse I had to be a little flexible: delays in all the visited countries, online-information that was not updated, problems due to the snow storms in North-Italy and Croatia, different ferry hours in wintermonths which prevented me to visit the Parque Naturel de Ses Salines in Ibiza and even a strike which prevented me to visit the Parc Marin de la Côte Bleue in Southern France.

The marine protected areas I visited are already some of the best managed and we have to take this in account when interpreting the results from the interviews. Most MPA's I visited had a permanent unit or team that works in the MPA, where in the possession of a management plan, etc. This is certainly not applicable to all the 700 MPA's in the Mediterranean.

This report has two parts: a first part where general conclusions about budget, staff, threats, management gaps and exchange of information is given; and a second part where all visited marine protected areas are described in detail (general information, management, threats, management gaps, success stories, exchange of information, volunteers, my work). Especially the success stories are very interesting because too often only the threats and management gaps are discussed, while there are many positive stories to tell aswell.

My project has slightly changed from its original intention, not only have I visited more MPA's but I was also not able to visit enough World Heritage sites to fulfill one of my objectives: to investigate whether World Heritage sites can be considered as 'models of management excellence'.



*Overview of the 15 visited marine protected areas, following the coast of the Mediterranean Sea and starting in Gibraltar: Southern Waters of Gibraltar, Isla de Tabarca (Spain), Levante de Mallorca - Cala Ratjada (Spain), Parque Nacional del Archipiélago de Cabrera (Spain), Réserve Naturelle Marine de Cerbère-Banyuls (France), Marine Natura 2000 site Posidonies du Cap d'Agde (France), Parc national de Port-Cros (France), Area Marina Protetta Isola di Bergoggi (Italy), Area Marina Protetta Portofino (Italy), Parco Nazionale Arcipelago Toscano (Italy), Area Marina Protetta Isola de Ventotene e Santo Stefano (Italy), Area Marina Protetta Torre del Cerrano (Italy), Nacionalni parc Kornati (Croatia), Nacionalni parc Brijuni (Croatia), Riserva Naturale Marina di Miramare (Italy).*

## Budget and staff

The budget from the marine protected areas in 2010 varied between 100,000 € and 7 million €, but this has decreased significantly in the last two years. On average, the total annual budget has decreased with 5% over the last two years. Eight from the 15 MPA's have reported a decreased budget, even up to -75%; for six MPA's the budget has remained approximately the same and one MPA saw its budget get doubled in 2012, although this was due to an exceptional procedure. Financial problems are worst in Italian and Spanish MPA's.

Budget cuts were accomplished by reducing the number of staff, performing less maintenance works, temporary halt monitoring programs or updates of the management plan.

Nine of the fifteen MPA's receive 95% or more of their financial sources from the government. The other six receive respectively 90%, 80% (2x), 60%, 40% and 10% of their budget from the government. Their alternative ways of financing include port fees, fees from diving and recreational fishing permits, selling of promotional materials, renting of equipment for an underwater trail, ...

In 2012, the number of staff varied between 3 and 260, although the latter includes all people working for the park authority, which is also responsible for tourist facilities. Five from the seven MPA's with less than 10 employees are not responsible for law enforcement, which is performed by the (coastal) police.

Volunteers work in most of the MPA's and are mainly students studying natural sciences. Several MPA's could use more volunteers, but there are restrictions with available accommodation, the sometimes time-consuming organisation and

insurance that is necessary to work on a boat or to use dive equipment.

## Threats

Two-thirds of the studied MPA's are threatened by some sort of fishing pressure, whether it is general, illegal or recreational fishing. Most important are illegal fishing, affecting half of the MPA's, and general fishing pressure, affecting one third of the MPA's.

Marine pollution, marine invasive species and tourism each affect approx. one third of the MPA's.

Ship traffic activities (nearby containerport or busy cruise ship lane), rising sea water temperatures, beach nourishment, coastal development and oil spills each affect approx. 10% of the MPA's.

## Management gaps

The two most important management gaps are political – bureaucratic problems, affecting three-thirds of all the MPA's, and lack of adequate financial resources, affecting one-fourth of the studied MPA's.

The political – bureaucratic problems are mainly related with the bureaucracy resulting from government interference: permits and authorizations that are required for small things and that take time to arrange, politicians that control the management authority (especially in Italy), no real political support. Shared management between different governments or institutions also causes frustration with one fifth of the MPA's.

The lack of financial resources was mainly caused by the budget cuts that have been made in the last two years. At the same time it is the case for many National Parks and Marine Reserves not allowed to ask money for entrance-tickets or services (e.g. diving

fee). So we are faced with a strange situation where governments forbid the most viable alternative ways of financing, but at the same time are not able to provide adequate financial resources.

### **Exchange of information**

All MPA's were having contacts (e.g. keeping in touch after conferences) with other MPA's or National Parks, mostly in the own country and with the nearest MPA's. Only four of the 15 MPA's had no contacts with other MPA's outside their own country. Contacts outside of Europe went through France, which has some MPA's and National Parks in its overseas territories (Nouvelle Caldenonie, La Reunion, Gaudeloupe) and Spain, where the rirm (Network of Ibero-American Marine Reserves) tries to be a meeting point between MPA's from Spain and South-America.

Exchange of information is even more limited to the nearest MPA's in the same country, although workshops and initiatives from the MedPAN Network are becoming increasingly important.

An important factor aswell is that many people working in MPA's have worked in other MPA's in their country, bringing their knowledge and network with them when changing jobs. Most information that is exchanged deals with scientific data and paperwork.

When faced with a specific problem, MPA's ask solutions or advice from the MPA's they are already in close contact with, in stead of looking for MPA's that could best help them.

In general, MPA's only look for advice or information when faced with a problem, although there does not has to be a problem to benefit from success stories from other MPA's. An example is the case of ecological mooring buoys, a concrete solution for a concrete problem that is now

used in several MPA's all over the Mediterreanean.

There are however many success stories that could be interesting for other MPA's, especially about alternative ways of financing, visitor centers, underwater trails (french: sentier sous-marin), artificial reefs, measures to protect endangered species, ways to control the number of visitors – recreational fishing, how to change possible aversion towards the MPA, ...

A table with names, email-addresses, success stories and topics where information would be welcome is given at the end of this document.

Biggest constraints for exchange of information are the language barrier and the difficulties in finding the right person that can help (aka finding the right email-address).

### **EUROPARC**

All visited MPA's knew about the EUROPARC Federation and six of them are full members. Three other MPA's used to be member, but have cancelled because there is not enough money for membership. These three MPA's are however member through their government, which passes on information.

Some MPA's shared the impression that EUROPARC is mostly a 'terrestrial thing', dominated by countries with little or no coastline where marine issues are not so important. However, some of the MPA's believed that the voice of nature protection in Europe could be stronger if there would be more communication and consultation, since several of the core-issues and problems are the same for terrestrial and marine protected areas.

### **Alfred Toepfer Foundation**

From the 15 visited MPA's, only two knew the Alfred Toepfer Foundation. One of

those applied last year for the Alfred Toepfer Natural Heritage Scholarship.

## Overview of visited marine protected areas

### Southern Waters of Gibraltar

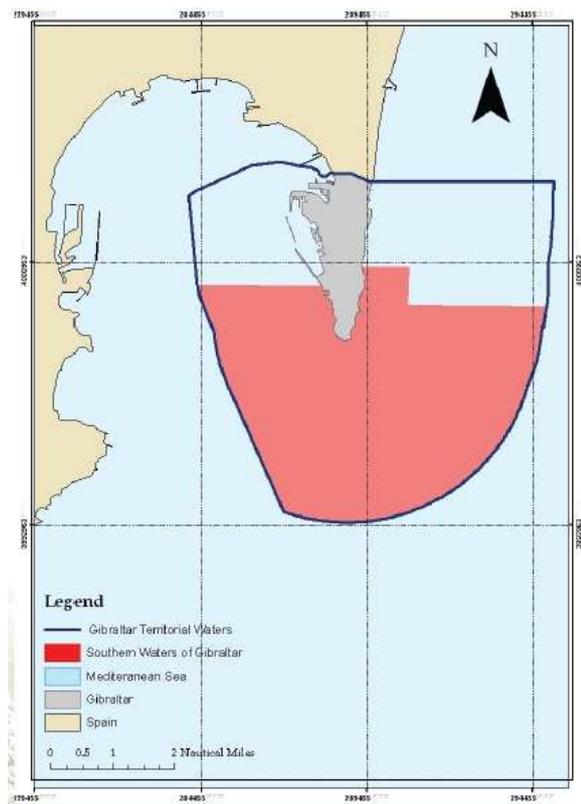
#### Introduction

Although the Southern Waters of Gibraltar (SWG) have been protected since 1991 (through the Nature Protection Act), it officially became a protected area in 2006, when it was designated as a Site of Community Interest (SCI) (UKGIB0002). The Government of Gibraltar declared the SWG (5,486.5 ha) as a marine Special Area of Conservation (SAC) in 2011. Although Gibraltar's application (through the United Kingdom) for the designation of the SWG as a marine SAC/SPA was accepted by the Commission in 2006, Spain subsequently also included a marine SCI by the name of Estrecho Oriental in its Natura 2000 network which includes the SWG and the majority of British Gibraltar territorial waters.

#### Management

The Southern Waters of Gibraltar are managed by the Ministry of Environment, which is responsible for policy and monitoring. Enforcement is done by the Royal Gibraltar Police, the Environmental Agency and Port Authority. Research is mainly performed by the Department of the Environment, NGO's and the Gibraltar museum, which has an Underwater Research Unit that focuses on habitats and species. A new government was elected in 2011 and is currently in the process of establishing a Management Board and a reevaluation of policy, monitoring, enforcement and research. The new minister of Environment, Dr. John Cortes, was the former director of the Gibraltar Botanical Gardens and it is expected he

will direct the Ministry towards an evenmore environmentally friendly direction.



**Above:** Map of the Southern Waters of Gibraltar. Adapted from management scheme 2011.

Since Gibraltar is a very small country (surface of 6 km<sup>2</sup> / approximately 30,000 inhabitants in 2011<sup>1</sup>), the people that work in the SWG mostly do so as part of their multi-faceted job responsibilities. The Environmental Officers for example are working on issues such as coastal sampling and marine habitat management in addition to other environmental

<sup>1</sup> Wikipedia

management issues in Gibraltar whereas the Royal Gibraltar Police carries out enforcement patrols within the Southern Waters in addition to various other activities in Gibraltar waters. It is therefore difficult to come up with a number about staff or budget since the staff that work in the SWG do so as part of their broader work responsibilities.

The first management plan was introduced in 2011 and updates and evaluations are planned every year. So far, Gibraltar has experienced no major consequences from the current economic crisis, and budgets for nature protection have not yet changed.

The Southern Waters of Gibraltar have been protected since 1991 through the Gibraltar Nature Protection Act. The Southern Waters are also protected under the Birds and Habitats Directive amongst numerous other EU legislative requirements. Information in relation to the Southern Waters is relayed to the EU on a six-yearly basis in line with Natura 2000 surveillance reporting requirements. A Marine Leisure Act that will regulate recreational angling and other recreational activities is currently being developed. Commercial fishing is however illegal in Gibraltar

### Values

The Southern Waters of Gibraltar exhibit a rich diversity in habitats, (migratory) species and geological features. Habitats include sea cliffs, caves, sandy planes and natural and artificial reefs.

Many pelagic and predatory fish live in or just next to the SWG. Several cetaceans migrate through the SWG, such as different species of dolphins (common - *Delphinus delphis*, bottlenose - *Tursiops truncatus*, risso's - *Grampus griseus*, striped - *Stenella coeruleoalba*) and whales (minke - *Balaenoptera acutorostrata* , fin -

*Balaenoptera physalus*, killer – *Orcinus orca*, sperm - *Physeter macrocephalus*). The common dolphin also breeds in the Bay of Gibraltar. Loggerhead turtles (*Caretta caretta*) migrate through the SWG and are observed and recorded during migration periods. The Mediterranean ribbed limpet (*Patella ferruginea*) is a rare species, that is found in the SWG.

Thousands of migratory seabirds stop over and feed within the SWG, such as cormorants and shags (*Phalacrocoracidae*), and different species of tern (*Sternidae*) and gull (*Laridae*). There has been a non-stop monitoring program of migratory birds since 1987, when the Strait of Gibraltar Bird Observatory was established by the Gibraltar Ornithological and Natural History Society. It is estimated that about 300 million birds cross the Strait of Gibraltar (in both directions) each year (Barrios Partida, 2007).

Underwater geological features are mostly associated with submerged morphological and archaeological features, created during the Ice Ages.

### Threats

The five biggest threats to the Southern Waters of Gibraltar are illegal fishing, marine pollution, marine invasive species, marine transportation and water based recreation.

No commercial fishing is allowed in Gibraltar but Spanish fishing vessels have been known to cross the border and use nets that are prohibited by the Gibraltar Nature Protection Act 1991. Turtle and cetacean bycatch has been observed in the past being the reason why the Royal Gibraltar Police routinely monitors the Southern Waters to avoid illegal fishing by Spanish fishing fleets based in the bordering towns of La Linea and Algeciras

Marine pollution mainly consists of minor oil

spills, which occur several times a year but are mostly too small to have a big impact. There is one big sewage outlet where the sewage plume sometimes can be observed but the outlet is located at Europa point, where currents are strongest and the plume is quickly mixed with surrounding waters. The Gibraltar Government has a bathing water quality monitoring programme which has been operational since the early 1980s and results show that the cleanest beaches are indeed found within the Southern Waters of Gibraltar.

Marine invasive species inside the Southern Waters of Gibraltar are for now limited to some algae, such as the *Asparagopsis armata*, a red seaweed. Bearing in mind that over 100,000 vessels transit the Strait of Gibraltar each year, more marine invasive species will probably pop up.

Anchoring can destruct habitats, but this is limited by only allowing anchoring in designated areas such as sandy plains and areas where anchoring has always occurred outside the marine SAC. Since regulations have been put in place, it is believed that this threat will decrease in the future. With over 100,000 vessels transiting the Strait of Gibraltar each year, the port of Gibraltar is one of the Mediterranean's biggest bunkering ports. In 2011, 71 cruise vessels brought over 200,000 passengers onshore and 10,000 ships (275 million tonnes) called on the Port of Gibraltar (compared to 4,500 ships with a tonnage of 120 million in 2001)<sup>2</sup>. Exact impacts from e.g. noise are not fully understood but the Department of the Environment operates a coastal monitoring programme in line with the Water Framework and Marine Strategy Framework Directives to monitor any potential impacts.

Water based recreation such as angling, jet

ski's and scuba diving is currently considered a threat (mostly because the exact impacts are not well known). There have been major complaints from local anglers about irresponsible and non-Gibraltarian anglers. The Ministry for the Environment is now working on a new Leisure Act that will manage those activities. The Government is also in the process of creating a 'diving hub', to better control and accommodate the growing number of divers that are attracted by the abundant marine life and many wrecks.

### Management gaps

The biggest management gaps are related to data collection, enforcement and cooperation with Spain.

Data collection is particularly a problem because new issues constantly spring up in the marine environment and research may be lacking in some specific areas. The migratory movements of species through the Southern Waters of Gibraltar and the Straits of Gibraltar generally is one example. Creative ways of gathering data need to be implemented as is the case with monitoring migratory cetaceans and reptiles where the Ministry for the Environment relies on data collected by tour operators within the Southern Waters in addition to data collected by the Ministry as part of the Habitats Directive Surveillance Monitoring Programme. The European Commission requires information on coastal water, marine sediments, habitats and species, and the Ministry is constantly developing their monitoring programmes to ensure that these are EU compliant. There is also a lot of information being collected by non-governmental organisations, especially on migratory birds, such as the data collected by the Gibraltar Ornithological and Natural History Society.

A second management problem deals with

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2. <http://www.gibraltarport.com/statistics>

the need for more resources for the police. Police officers require specialized training to keep track of changing legislation.

There are also some political problems dealing with the fact that the Spanish Government has designated the Southern Waters of Gibraltar as a marine reserve in 2009, namely the Estrecho Oriental, which contains almost all of Gibraltar's territorial waters even though these are outside Spain's jurisdiction.



**Above:** Impression of the Southern Waters of Gibraltar (© Robbert Casier).

**Below:** Impression of one of the artificial reefs in Camp Bay (© Robbert Casier).

Other political problems arise from the fact that Gibraltar is part of the United Kingdom which has not signed the Barcelona Convention. In any case, those parts of the Barcelona Convention which are an EU

requirement are nevertheless still applicable to Gibraltar.

### Success stories

Concerned by the alarming low levels of Spider crabs, the Government of Gibraltar prohibited their catch in 1981. The spider crab population has since then increased and has now attained more stable levels. It was quite a challenge to put the prohibition in the law (Dr. John Cortes – current Minister of Environment – helped writing that law) but once installed, it was strictly controlled. There are still occasional reportings from the police arresting people that caught spider crabs.

After thoroughly cleaning, several barges were sunk on purpose in the 1970s and 1980s and they have become popular diving destinations. The first artificial reefs were two barges that were sunk in 1974 in Camp Bay. These artificial reefs are now teaming with life. After thirty years in the water, some of the barges have started breaking up, and the Government is currently looking at the creation of new artificial reefs.

The Ribbed Mediterranean Limpet (*Patella ferruginea*), protected under annex IV of the EU Habitats directive, is one of the most endangered endemic Mediterranean species. There is an important stronghold of this species in certain locations around Gibraltar including the Southern Waters Marine SAC/SPA. All activities (e.g. construction or development projects) that could affect *P. Ferruginea* populations require comprehensive assessments and if need be, the relocation specimens, so that the total population is not affected. During a recent upgrade of coastal revetments, about 100 specimens were relocated, from which, to date, about 80% have survived. A paper on this topic is about to be published by Dr. Darren Fa from the Gibraltar Museum (Marine Research Group).

## Exchange of information

Contacts with other marine protected areas are limited and mostly confined to electronic contacts. The SWG occasionally participates in conferences but they are not yet part of any network outside Natura 2000. Exchange of information with other Spanish marine protected areas has been complicated due to political reasons. Efforts are currently focused on expanding monitoring networks and the provision of information online (Southern Waters of Gibraltar website). There are also plans to increase ties with other marine reserves such as Malta with whom Gibraltar has a historic relationship.

## Volunteers

There are volunteers working in the Southern Waters of Gibraltar, mostly through NGO's. The majority of the volunteers are students studying marine sciences or members of diving clubs, that help with cleaning campaigns. More volunteers could be used but the biggest constriction is the supply.

## My work

I was in Gibraltar on Monday the 16<sup>th</sup> and Tuesday the 17<sup>th</sup> of January. On Monday, Mr. Stephen Warr, Environmental Officer at the Ministry of the Environment, showed me the most striking features of the Southern Waters of Gibraltar: the artificial reefs, the cliffs and Europa Point (a popular place for ornithologists since the 1960s). Mr. Warr gave me a lot of information and he also took me to the top of 'the Rock' to give me a general overview of the marine protected area. During the afternoon Mr. Warr arranged a diving excursion for me and I could admire the abundant marine life and some of the artificial reefs. With a visibility of 15-20 meters, we saw octopuses, basses, urchinoids, sea stars and shoals of fish.

On Tuesday, I had a meeting with Dr. John Cortes, Minister for the Environment, Dr. Liesl Torres, Sr. Environmental Officer, Mr. Stephen Warr, Environmental Officer and Mr. Albert Bruzon, Principal Secretary. I interviewed them about the values, threats, success-stories and exchange of information of the Southern Waters of Gibraltar.

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F. Barrios Partida. 2007. Nomads of the Strait of Gibraltar: A Field Guide to Bird Migration, the Natural Parks of the Strait and Los Alcornocalse, and the Rock of Gibraltar. Editorial Acento 2000. 430 pp.

## Marine Reservas Marinas de España

### General information

There are currently 23 marine reserves in Spain, from which 10 are managed solely by MARM<sup>3</sup> or in conjunction between MARM and the Spanish regional governments. In total, the marine reserves cover an area of 100,000 hectares, from which 10% are a Category I (IUCN). The oldest Marine Reserve is Isla de Tabarca, which was declared in 1986. Up to five years ago, most of the financial resources for the initial creation of the reserve and its management came from the European Structural and Cohesion

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3 MARM or the Spanish Ministerio de Medio Ambiente y Medio Rural y Marino

Funds, but now the Government of Spain is providing adequate financial means. Marine reserves in Spain are quite unique in the sense that they do not comply with the common definition of a Marine Reserve which states that “Marine reserves are defined as ocean or intertidal areas that are fully protected from activities that remove animals and seaweeds or alter habitats – such as fishing, aquaculture, dredging and mining – except as needed for scientific monitoring”<sup>4</sup>. Spanish marine reserves are primarily used as a fishery management tool, in order to allow sustainable artisanal fishing. Over the years, conservation of marine biodiversity in general also became one of the core objectives, but the primary focus remains on fisheries. Permanent surveillance units, that control the reserves at all times, are in place in most of the marine reserves. The ten Spanish Marine reserves are Isla de Alboran, Cabo de Gata-Níjar, Cabo de Palos-Islas Hormigas, Cala Ratjada-Levante de Mallorca, Islas Columbretes, Isla Graciosa, Masia Blanca, Isla de Palma, Punta de la Restinga-Mar de las Calmas and Isla de Tabarca.

In Madrid, three people work full time for the marine reserves. Their main tasks are supervision, bringing together information, supervising the technical equipment, creating brochures and educational materials, ... Currently, there are working about 45 people in all the Spanish marine reserves and an annual budget of 3.5 million euros is available. The total budget used to be 5 million euros, but has been reduced in the scope of the financial problems. 85% of the budget is used for enforcement and maintenance. The department owns 15 vessels, which are distributed among all reserves, vehicles, all kinds of special camera's (infrared,

georeferenced, underwater) and navigation technologies.

Plenty of information in Spanish and English is available at the website: <http://www.reservasmarinas.net/>.

### My work

On Wednesday the 18<sup>th</sup> of January, I had a meeting at the Ministerio of Medio Ambiente y Medio Rural y Marino, Department of Marine Resources and Aquaculture, Madrid. I met Mrs. Silvia Revenga Martinez de Pazos, senior officer dealing mainly with scientific follow up and awareness, Mr. Pepe Bedoya and Mr. Juan Carlos Jorquera Gámez. Mrs. Revenga gave me a broad overview of the Spanish marine reserves, how they were established and how they are monitored and managed. She also informed me about the status of the marine reserves, and what effects have been observed so far. After the presentation, I asked her some questions, mainly about the management, exchange of information and success stories. I also received an information-package, with brochures and DVD's.



*The ten Spanish marine reserves that are managed by MARM (orange), or by MARM and the regional governments (green).*

4 Partnership for Interdisciplinary Studies of Coastal Oceans. 2011. The Science of Marine Reserves (2<sup>nd</sup> Edition, Europe)

Mr. Pepe Bedoya, responsible for the educational materials, leaflets, articles and

the website, showed me the recent projects he had been working on, such as the website and 'awareness-games' for children.

Mr. Juan Carlos Jorquera Gámez is responsible for all technical issues related to enforcement. He gave me more information about the tools that are at the marine reserves' disposal: small and big vessels, buoys, (underwater) camera's and mini-ROVs (Remote Operated Vehicles), navigation tools, monitoring centres, side-scan sonar, georeferenced camera's, remote camera's that monitor parts of the coast, ... He also informed me about the biggest challenges for the rangers, their training and the constant struggle to keep ahead of the technologies and techniques used by illegal fishing vessels.

## Sources

Interview with Silvia Revenga Martinez de Pazos, Juan Carlos Jorquera Gamez and Pepe Bedoya.

Subd. Gral. de Recursos Marinos y Acuicultura - Dirección General de Recursos Pesqueros y Acuicultura - Secretaría General de Pesca - Ministerio de Agricultura, Alimentación y Medio Ambiente.

<http://www.reservasmarinas.net/>

Videos: "todos por la mar", 2007, Marea Films and "Isla de Tabarca, reserva marina", MARM.

## Isla de Tabarca

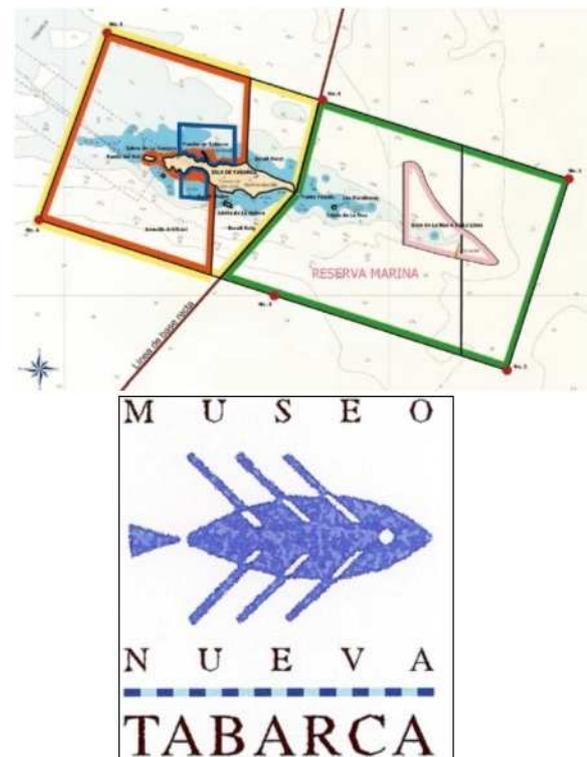
### Introduction

The marine reserve Isla de Tabarca (1,754 ha) was designated in 1986 and is the oldest Spanish marine reserve. Its primary mission is "to protect, regenerate and develop resources of fishing interest to

maintain sustainable fisheries<sup>5</sup>" but secondary objectives include marine research and the protection of fauna, flora and seabed. The reserve is part of a Natura 2000 site (ES0000214).

### Management

The marine reserve Isla de Tabarca is managed by the Regional Government of Valencia and the Government of Spain, because the reserve is split up by the 'línea de base recta', which forms the border between Spanish and Valencian waters.



**Above:** Map of the Isla de Tabarca, with the different zones and coastal base line (adapted from <http://www.reservasmarinas.net/>)

**Below:** Logo of the museum on the island, which summarizes well the philosophy of

5 Subd. Gral. de Recursos Marinos y Acuicultura - Dirección General de Recursos Pesqueros y Acuicultura - Secretaría General de Pesca - Ministerio de Agricultura, Alimentación y Medio Ambiente.

### *the reserve*

Ten people currently work for the reserve: six rangers, one scientific coordinator, one administrative assistant and two museum guides. Rangers are authorised to write fines and issue arrests; and they also collect garbage. As the “eyes of the Ministry”, the rangers, in teams of two, surveill the reserve seven days a week by using two boats: the *Llamia II* and the *Punta Falcón*. The boats are equipped with all modern equipment such as georeferenced camera's (useful for evidence in court), navigation devices and night vision camera's. A terrestrial vehicle and diving equipment are also at the Reserve's disposal. Plenty of information is available at the website (<http://www.reservasmarinas.net/reservas/tabarca>).

There is a service office on the island, with a small kitchen, office and some beds. Next to the service office is a police office, with a permanent police force. Since 2002, there is also a small cinema and museum where 8,000 visitors per year learn about the history, natural values, fisheries and the marine reserve (ticket of two euros). The City of Alicante owns a house on the island, where there is classroom that can be used to teach students about the marine reserve. In that house 30 beds are available for schools or volunteers.

The people working in the marine reserve of Isla de Tabarca are contracted by TRAGSATEC, a public company, and paid by the Spanish Ministry for Fisheries and Agriculture. The annual budget for the marine reserve was 1,5 million euros, but due to budget cuts this has been reduced with approximately 25%. This reduction is mainly accomplished by cancelling the annual maintenance of the buoys, a very time-consuming activity that requires diving.

There is no real management plan for Isla

de Tabarca, but a general plan – roadmap for all Spanish Marine Reserves applies. This plan requires coordination with Madrid, the Conseilleria, municipality and fishermen.



**Above:** Information board in the harbour of Tabarca (© Robbert Casier).

**Below:** View on the south-western point of Tabarca, where plenty of birds live (© Robbert Casier).

There is a no-take zone where only scientific activities are allowed, and the rest of the reserve, where some types of artisanal fishing are allowed. No industrial and recreational fishing is allowed in the entire reserve.

Scuba diving, professional trolling and the setting of two 'morunas gruesas' (special type of net) are allowed in Spanish waters. In Regional waters, it is allowed to scuba dive (with prior authorization of the

Regional Government), to hook-fish (except long-lines) and to set ten 'morunas xirreteras' (special type of net) from September to November. There are also two delineated anchorage areas and a no-take zone. The reserve is demarcated by six buoys equipped with a light and topmark.

## Values

Migratory birds visit the island twice a year, and the Island of Tabarca is part of a marine important bird area (IBA) (ES407). Birds such as the ruddy turnstone (*Arenaria interpres*), storm petrel (*Hydrobates pelagicus*), thekla lark (*Galerida theklae*), cory's shearwater (*Calonectris diomedea*) and audouin's gull (*Larus audouinii*) are the most iconic species.

An artificial reef, installed in 1989, is now exhibiting plenty of marine life such as the Gold Blotch grouper (*Epinephelus costae*) and many sea breams and invertebrates. Meadows of Posidonia (up to two meters, representing a growth 2000 years) are important nursery grounds for the pen shell (*Pinna nobilis*) and fish such as the salemo porgy (*Salpa salpa*) and groupers (*Epinephelus marginatus*). In the marine reserve you can also find octopuses (*Octopus vulgaris*), red mullet (*Mullus surmuletus*), loggerhead turtles (*Caretta caretta*), the Mediterranean slipper lobster, also called the 'Sigar of the Sea' (*Scyllarides latus*) and seahorses (*Hippocampus ramulosus*).

Until the 1930s, there was a colony of Mediterranean monk seals (*Monachus monachus*) on the island but they have not been observed since.

## Threats

The biggest threats to the marine reserve are general fishing pressure, the number of tourists and climate change.

Although fishing is controlled, it remains a general pressure for the reserve. Not all fish is being reported at the 'loncha' (fishmarket) in Santa Pola (which is mandatory) but is sometimes sold directly to the restaurants at Tabarca. Most fishermen active in the reserve are living in Santa Pola (the nearest harbour on shore) and are thus harder to involve in the activities from the reserve. Also, when confronted with large schools of pelagic fish that enter the marine reserve, presence of the rangers is necessary to prevent fishermen, in all their enthusiasm, forget about the borders of the reserve.

In summer, the island is a popular tourist destination and up to 5,000 people visit the island per day (normally around 1,000 people, very calm in winter). Most of them are day tourists, but it is also possible to sleep on the island. This big increase in population (only 250 people live at the island permanently) has several impacts, e.g. the sewage water, that is discharged through a pipeline deeper in the reserve, causes a plume that can sometimes be seen. The exact impact on biodiversity is unknown.

Tourism is the main source of income and thus priority number one for the island. This can cause minor aversions towards the reserve, e.g. information boards to keep tourists out of important bird nesting areas were thrown over by local residents.

Climate change and the expected further rise in sea water temperatures will have great impacts on the gorgonia populations, which are very sensitive for warm waters. In last summers, and especially during the summer of 2011, many gorgonia's died and bleached.

## Management gaps

The biggest management gaps are related to the shared management between the State and Valencia and administrative

complications.

Management of the marine reserve Isla de Tabarca is shared between the State and the Regional Government of Valencia, while the town of Tabarca belongs to the municipality of Alicante. This means that all three parties need to be brought together to change legislation or to discuss problems. Another problem is that the part of the reserve that is visited more frequently by e.g. recreational vessels is located around the island, which falls under the jurisdiction of the Regional Government. This means that the rangers, working for the Spanish Government, have no authority to issue fines for e.g. vessels that anchor outside the anchorage area. They can however give verbal warnings. For the same reason is it not possible to limit the number of tourists.

Diving permits have to be requested at the sub-office of the government of Alicante or at the Regional Government of Valencia, depending on where you want to dive. This complicated situation results in a maximum of 50 divers per month.

A minor management gap is that since people working in the marine reserve are no official representatives of the reserve, they can also not give any official statements. Interviewing people working in the marine reserves can therefore be difficult.

### Success stories

The biggest success story is the reserve effect, clearly evidenced in the marine reserve Isla de Tabarca. Since 1983, several species have significantly increased, notoriously groupers (*Epinephelus marginatus*) and slipper lobsters (*Scyllarides latus*). More and more juvenile spiny lobsters (*Palinurus elephas*) are also been seen. Most fishermen now accept the reserve because they apparently are catching more fish. There

are also plans to extend the marine reserve 400 m to the north, to include some recently discovered biodiversity hotspots, including red gorgonians.

Another success story is the fact that artisanal fishing still exists in the marine reserve and is quite successful.

At its creation, when there was no permanent monitoring yet, appr. 20 – 30 offenses were issued per year (mainly for underwater- and recreational fishing). Permanent monitoring started in 2006, and offenses have diminished until an annual average of 2 - 3 (some years even zero). The permanent control has thus clearly discouraged illegal fishing.

### Exchange of information

There are good contacts with the other marine reserves in Spain and if faced with a problem, contacting other reserves directly is quite easy. Once a year, the coordinators of all Spanish marine reserves meet and exchange information, but this meeting has been cancelled this year due to budget cuts. There is also exchange of information through the scientific institutions that work in different marine reserves, such as the University of Alicante and the Institute of Littoral Ecology of El Campello.



**Above:** View at the main beach of Tabarca (© Robbert Casier).

**Below:** One of the surveillance vessels that is used by the marine reserve (© Robbert Casier).

Isla de Tabarca is also part of rirm (Red Iberoamericana de Reservas Marinas), but contacts go through the Secretaria General del Mar in Madrid and are mostly limited to occasional electronic contacts.

There are no contacts with other countries. The Isla de Tabarca is no member of EUROPARC and MedPAN.

### Volunteers

Volunteers help in the reserve especially in spring and autumn with beach clean-ups. Every year a group of volunteers, composed of students but also working people, come to the island and help in the CEAM (Centro de Educacion Ambiental de la Isla). They sleep at the house from the municipality, where 30 beds are available. Some of the volunteers have been coming for many years. There are some possible plans to use volunteers during the year, where they could form a team together with one of the permanent rangers.

### My work

I visited the Isla de Tabarca on Friday the 20<sup>th</sup> of January. I was picked up in Alicante in the morning by Mr. Felio Lozano, who brought me to Santa Pola, from where the *Llamia* brought us to the harbour of Isla de Tabarca. Mr. Lozano introduced me to the two rangers that were active, and showed me their office (where they sleep, eat and work). Afterwards he showed me the village of Tabarca and the most striking features of the island: a bird nesting area, the cliffs where seals were once living, the coastline. I was also shown the 'House of the Sea' (owned by the Municipality of Alicante, where presentations and info-sessions are given), the museum (with information about the history of the island and its fishing activities) and the small cinema, where we watched a movie about the reserve that is shown to visitors. Afterwards we joined a

surveillance tour around the island with the *Punta Falcon*. I was shown the buoys, the equipment on board and the marine reserve in general. Mr. Lozano was kind enough to bring me back to Alicante.

### Sources

Interview with Felio Lozano

<http://www.reservasmarinas.net/>.

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Several brochures and booklets from the Subd. Gral. de Recursos Marinos y Acuicultura - Dirección General de Recursos Pesqueros y Acuicultura - Secretaría General de Pesca - Ministerio de Agricultura, Alimentación y Medio Ambiente.

### Reserva marina del Levant de Mallorca - Cala Ratjada

#### Introduction

The marine reserve Levante de Mallorca - Cala Ratjada (11,286 ha) was designated in 2007, at the request from the artisanal fisheries sector. The primary purpose of the reserve is "to protect, regenerate and develop resouces of fishing interest to maintain sustainable fisheries<sup>6</sup>". Every year, appr. 6,000 people come to dive in the reserve. Cala Ratjada is part of a Natura 2000 site (ES0000227).

#### Management

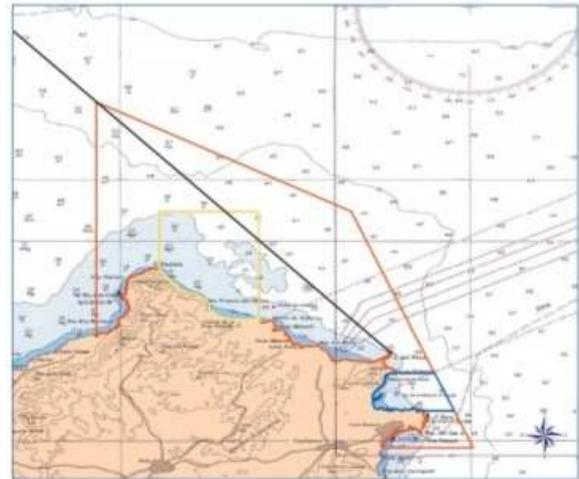
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<sup>6</sup> Subd. Gral. de Recursos Marinos y Acuicultura - Dirección General de Recursos Pesqueros y Acuicultura - Secretaría General de Pesca - Ministerio de Agricultura, Alimentación y Medio Ambiente.

The marine reserve Cala Ratjada is managed by the Regional Government of the Balearic Islands and the Government of Spain, because the reserve's territory is split up by the coastal base lines, which divides areas managed by the State and others managed by the regional authorities.

There are currently five employees: one scientific coordinator and four rangers that surveill the reserve seven days a week (surveillance has been continuous since 2008). Other rangers, technical assistants or skippers are normally contracted in the busy summer-season, but this is now cancelled due to budget restraints. The people working in the marine reserve of Cala Ratjada are contracted by TRAGSATEC, a public company, and paid by the Spanish Ministry of Agriculture, Food and Environment. The 11 m long vessel *Luz Murube* equipped with modern equipment such as georeferenced camera's (useful for evidence in court), navigation devices and night vision camera's, two terrestrial vehicles and a mini-ROV<sup>7</sup> equipped with camera are at the team's disposal. There is ample information on the websites [http://www.reservasmarinas.net/reservas/cala\\_rajada/situacion.asp](http://www.reservasmarinas.net/reservas/cala_rajada/situacion.asp) and <http://www.magrama.es/es/pesca/temas/espacios-y-especies-marinas-protegidas/reservas-marinas-de-espana/levante-de-mallorca-cala-rajada/>.

There is an annual budget of appr. 350,000 €, but this used to be 500,000 € in previous years. Since 70% of the budget is used for staff-expenses (brut salary, before taxation), this reduction has been accomplished by diminishing the number of rangers from nine to five.



**Above:** Map of the Cala Ratjada marine reserve (adapted from [www.reservasmarinas.net](http://www.reservasmarinas.net)).

**Below:** Impression from the marine reserve (© Robbert Casier).

There is no real management plan for Cala Ratjada, but a general plan – roadmap for all Spanish Marine Reserves applies. This plan requires coordination with Madrid, the Balearic Government, Municipalities and fishermen.

The reserve is made up of three zones: the integral reserve of Cabo Ferrutx, the special use area of Cala Agulla and the marine reserve of Cala Ratjada. The integral reserve is a no-take zone where only scientific research is allowed. The special use area and the marine reserve

7 ROV – Remotly Operated Vehicle

currently have the same level of protection. The special use area was designated in case extra protection measures are needed for the pearly razorfish fishery (*Xyrichtys novacula*). Industrial fishing is forbidden in the entire reserve, as is bottom trawling, purse-seine netting, deep-water and surface longlining by traditional fishers. Artisanal fishers can use trammel-nets, gillnets, almadrabilla's, moruna's and llampuguera (technique used to catch *Coryphaena hippurus*) (in the special use area and general reserve. Diving and recreational fishing is allowed in those zones. Spearfishing, harvesting of any product from the reserve and fishing contests are illegal in the entire reserve.

## Values

The marine environment is characterised by the extensive *Posidonia oceanica* meadows, uniform and dense in the northwestern area and alternated with sandy, coastal detritic and precoraligenous beds in the northeastern area. Many biological communities are associated with the *Posidonia oceanica* beds, which are considered as refuges and hatching areas for many species of importance to fishing. Key-species include the dusky grouper (*Epinephelus marginatus*), largescaled scorpionfish (*Scorpaena scrofa*), brown meagre (*Sciaena umbra*), greater amberjack (*Seriola dumentii*), common spiny lobster (*Palinurus elephas*), Mediterranean slipper lobster (*Scyllarides latus*), European lobster (*Homarus gammarus*), common dolphinfish (*Coryphaena hippurus*) and squid (*Loligo vulgaris*). Bottlenose dolphins (*Tursiops truncatus*) and loggerhead turtles (*Caretta caretta*) are sometimes observed. There are also many coraligenous beds and a unique penumbra community (*Sciaphilous*, red algae) at Cabo del Freu. The coast is comprised of numerous calcareous cliffs, underwater caves and some pristine beaches.

## Threats

The biggest threats to the marine reserve of Cala Ratjada are illegal fishing, general fishing pressure, marine invasive species and beach nourishments.

Illegal fishing in Cala Ratjada is practiced mainly by local spear- and recreational fishers (recreational fishing is allowed but subject to regulations about e.g. gear and minimum sizes). Approximately 2,000 licenses for spearfishing are believed to be present in Mallorca and the surveillance team of the marine reserve of Cala Ratjada has observed approx. 150 different spearfishers in the reserve in 2011. When the surveillance team catches spearfishers in the act, a fine is issued straight away, but they can sometimes outrun the rangers with their faster boats. To surprise recreational fishermen, the surveillance team sometimes goes out early in the morning, late at night or around the reserve.

Although fishing is controlled, general fishing pressure remains a potential threat. Marine invasive species are not a threat specifically for the marine reserve of Cala Ratjada, but are considered a general threat for the Mediterranean.

In summer, the population of Cala Ratjada increases from 12,000 to 150,000 people, mainly because of the in-flow from German tourists. Hotel resorts often advertise the area by its perfect sandy beaches, although some of the beaches in reality consist of sand and rocks. The hotel owners therefore want to artificially nourish some beaches by using dredged sand from the marine reserve (to assure that the sand has the same characteristics as on the beach). For now, the government has always disapproved these requests, but political changes or increased pressure from hotel resorts could change that in the future. Dredging sand in the marine reserve

would affect the *Posidonia oceanica* meadows.

A minor threat to the marine reserve is marine pollution, caused by land runoff.

### Management gaps

Most important management gaps are caused by a lack of uniform legislation between the Spanish and Balearic Islands law.



**Above:** One of the surveillance vessels (© Robbert Casier).

**Below:** Impression of a pristine beach inside the reserve (© Robbert Casier).

The biggest management gaps for Cala Ratjada are related to lack of uniform legislation between the parts of the reserve that fall under Regional and State jurisdiction. The smallest fine that members

of the surveillance team can issue is 1,500 €, while this is 60 € for rangers working for the Balearic Islands. The rangers from the marine reserve therefore prefer to give verbal warnings for minor delicts, in order not to create any negative sentiments caused by disproportionate fines. Appr. 40 fines are issued each year. Another important issue is the fact that rangers from the surveillance team are licensed by the Guardia Civil, but they don't have the rights. Therefore they can not force people to stop fishing, apprehend fishing tools or issue arrests and when faced with serious people, the rangers have to call the Guardia Civil.

No service office or accommodation for the rangers is available in the harbour of Cala Ratjada. Staffmembers thus have to travel between Cala Ratjada and Palma de Mallorca (90 km) every day, for which they use one of the terrestrial vehicles.

Since Cala Ratjada is a relatively new reserve, there is a lack of long data series about the extracted biomass. Fishermen have to report all their catches to the 'lonja' (fishmarket) but this gives no information about where the fish comes from. Also recreational and professional fishermen have to report their catches.

A minor management gap is that the Ministry applies a strict control on communications made by its marine reserves. Interviews with people working for the marine reserves are therefore very difficult.

### Success stories

The biggest success story is the change in attitude towards the marine reserve from different stakeholders. When fishermen asked for the creation of a marine reserve, there was a lot of criticism from local stakeholders: it was said that grandfathers would no longer be able to angle with their

grandchildren and diveshops were afraid of more restrictions that would chase away tourists. They now all defend the marine reserve and understand its benefits. Dive-shops are currently cooperating and share information about the number of divers, divespots and observed species. Last year, 6,000 divers were drawn to Cala Ratjada by the wealth of fish, from which 85% were German tourists. There has been set a limit of 11,000 divers a year, so there is still a lot of potential.

Fish stocks have increased since the designation of the marine reserve, as evidenced by studies of the IEO (Instituto Español Oceanográfico). This has been confirmed by divers but also by the artisanal fishermen that asked for the designation. There is also a unique case where some fishermen from a village in the reserve have agreed amongst themselves to put in place a maximum quota per day for the catch of *Coryphaena hippurus*. This has resulted in a higher price for their fish, while they had to work less. For them, less fishing resulted in more income.

Recreational fishermen have to fill in a document after each catch: where they fished, which species, size. The document has been kept simple to avoid doubtful information (asking too much information would result in less viable info). Many of the recreational fishermen are cooperating well with this program.

### **Exchange of information**

The marine reserve of Cala Ratjada is part of the Network of Spanish Marine Reserves. Normally there are annual meetings where information is exchanged but these have been postponed last year due to budget restrictions. The reserves can contact each other easily and also do so if they need specific information / advice. There are no official visits to marine reserves, but some coordinators visit other

marine reserves during private holidays.

Cala Ratjada is also part of rirm (Red Iberoamericana de Reservas Marinas), but contacts go through the Secretaria General del Mar in Madrid and are mostly limited to occasional electronic contacts. Some of the coordinators have visited marine reserves in Latin-America during private visits.

There is also a good collaboration and exchange of information with the other Balearic marine reserves, and they sometimes offer help with patrols.

### **Volunteers**

There are no volunteers working in the marine reserve Cala Ratjada, mostly because the organisation is time-consuming and because it can be complicated to arrange insurance. Going on the boat or using equipment from the reserve requires special authorization from the Ministry. Volunteers could however be used for awareness campaigns in schools, beach clean up campaigns or monitoring.

### **My work**

I visited the Marine Reserve of Cala Ratjada on Monday the 23<sup>th</sup> of January. I was picked up in Palma by Mr. Javier Llorente, scientific coordinator of the reserve. Mr. Llorente brought me to the harbour of Cala Ratjada, where I met the three surveillance agents that were active that day. We then went out with the *Luz Murube* on a daily surveillance tour. I received information about the equipment on board, the most striking coastal features and the marine reserve in general. Afterwards, Mr. Llorente took me with one of the terrestrial vehicles and showed me some of the pristine beaches and cliffs. In the afternoon, Mr. Llorente took me to his office in Palma (TRAGSATEC), where he showed me some maps, technical equipment, movies and photographs of the

reserve. The GPS-coordinates from the surveillance vessels are sent directly to the main office in Palma, and maps of the travelled paths can be requested instantly. Mr. Llorente also gave me an information package. In the evening he dropped me back off in Palma.

## Sources

Interview with Javier Llorente.

<http://www.reservasmarinas.net/>.

Several brochures and booklets from the Subd. Gral. de Recursos Marinos y Acuicultura - Dirección General de Recursos Pesqueros y Acuicultura - Secretaría General de Pesca - Ministerio de Agricultura, Alimentación y Medio Ambiente.

Partnership for Interdisciplinary Studies of Coastal Oceans. 2011. The Science of Marine Reserves (2nd Edition, Europe).

## Parque Nacional del Archipiélago de Cabrera

### Introduction

“El Parque Nacional Marítimo Terrestre del Archipiélago de Cabrera (PNMTAC)” or Cabrera National Park was created in 1991 with the objective to conserve the natural area and its flora and fauna. The Park covers 10,000 hectares, from which 85% is marine territory. In 1995, a small part of the Park was declared as an integral reserve, where only scientific activities were allowed and from 2006 the Park is adjacent to a marine reserve. The artisanal fishery was regulated in 2001. The Cabrera National Park is a Natura 2000 site (ES0000083) and protected bird area (ZEPA). Each year about 60,000 people visit the Archipelago, 1,400 people dive in the Park and 100,000 people visit the Visitor Centre in Colonia Santa Jordi.

## Management

The Cabrera National Park is managed by the Regional Government Islas Balearias since 2008, prior to which the Spanish Government was responsible.

There are currently 22 people working for the Cabrera National Park, six civil servants (including four rangers), four labour servants, seven contractors (depending on available budget - skippers, technical assistants, fireworks, ...) and five aquarists. A few years ago an aquarium and visitor centre was built in Colonia Santa Jordi with the philosophy to bring the Park to the people in stead of bringing the people to the Park. The aquarium has 18 tanks and exhibits more than 4,000 species. Some information in Spanish is available at <http://reddeparquesnacionales.mma.es/parques/cabrera/index.htm>.

There used to be a budget of around 5 million € (2010) (from which 1 million euro is for the aquarium), but over the last two years the budget has decreased with 75%.

A management plan is available, and is normally evaluated every six years. A new management plan should be created this year, but it is uncertain if there will be sufficient funds.

The Cabrera National Park has different zones: reserve zones, zones of restricted use, zones of moderate use and zones of special use. Navigation is not allowed in most of the areas close to shore, diving is only allowed at some spots, mooring is only allowed in the harbour where buoys have been installed.

Recreational fishing and trawling are forbidden while purse-seine artisanal fishing is allowed.



**Above:** An artisanal fishing vessel leaves the harbour of Colonia Santa Jordi and sets course towards the Cabrera National Park (© Robbert Casier).

**Below:** Map of the Cabrera National Park. Adapted from Renones, 2007.

### Values

More than 150 bird species use the 19 islands of the Archipelago as a stopover during their annual migration. Audouin's gull (*Larus audouinii*), cory's shearwater (*Calonectris diomedea*) and storm petrels (*Hydrobates pelagicus*) are the most common residents.

More than 200 different fish species, 100 species of bryozoans, 20 species of molluscs, 25 species of crustaceans, 80 species of sponges and many more

invertebrates live in the Park, with waters up to 118 m. In recent years, more than 100 bycatch-turtles were reintroduced in the Cabrera National Park.

Different types of dolphins (*Tursiops truncatus*, *Stenella coeruleo-alban*, *Delphinus delphis*) and whales (*Globicephala melaena*, *Physeter macrocephalus*) can be observed.

*Posidonia oceanica* can be found up to depths of 50 meters, a record in the Mediterranean Sea.

### Threats

Marine invasive species are the only big threat to the Cabrera National Park, threatening marine ecosystems while cats and rats are threatening seabird colonies. There have been some successful rat eradication programs on some of the islands.

### Management gaps

The biggest management problems are lack of political support and financial problems.

In 2004 a law was approved which stated that management of the Spanish National Parks eventually should be transferred entirely to the Autonomous Communities (up to that time management was shared with the Spanish State), when they consider themselves capable of doing so. In 2008, management of the Cabrera National Park was transferred to the Islas Balearias. This also means that the Balearic Islands are now responsible for the budget of the Cabrera National Park, which they have not been able to do in the last two years. A new minister of Environment has been elected but after a few months in office he has not even visited the Archipelago.

Since 2010, total budget has dropped by 75% and this has ofcourse major

implications on daily activities. A special budget assigned for direct investments or special projects is now controlled by a major Spanish bank, which has now also a voice in choosing the funded projects. The Park is looking for alternative ways of financing, like introducing a ticket for visitors of the Interpretation Centre (including the Aquarium) or introducing a fee for private boat charters that bring tourists to the Cabrera Archipelago (now approx. 35 € pp). It would be easier to introduce a ticket for the Park, but since it is paid by public money (should be the case) it is illegal to ask money to enter. Entrance to the visitor centre (100,000 visitors each year) and Park (60.000 visitors each year) has always been free. The financial problems also risk to interrupt monitoring programs that have been in place for many years, e.g. bird migrations (60 days each spring).



**Above:** Aerial image of the main island of the Cabrera Archipelago, from an eyeheight of 11 km (© 2011 Google Earth).

### Success stories

Extensive scientific research for (marine) invasive species has been performed and there is now a very good comprehension of most of the invasive species present in the Cabrera National Park. Detailed maps have been made and there is plenty of

information available on how to handle specific invasive species. Successful rat eradication programs have been performed on some of the 19 islands of the Cabrera Archipelago, and seabird colonies are already recovering.

The fisheries management has proven to be very successful. As in many of the Spanish marine protected areas, artisanal fishing is allowed inside the Cabrera National Park. Relations with the artisanal fishermen are good and they are also in favor of the Cabrera National Park. In 2006 they asked to extend the marine reserve of Migjorn, and that reserve is now adjacent to the Cabrera National Park. Artisanal fishing is regulated through lists of allowed fishing gear and allowed 'brotherhoods' of fishermen. Plenty of data is available on the exact amount of extracted fish over the years and on the evolution of the CPUE<sup>8</sup>. Results will be published soon. There is also data available on the state of conservation (SOC) of many fish stocks. They show that different fish species respond with a different speed on protection measures, although banning of spearfishing is translated instantly in a recovery of affected fish stocks.

The third biggest success story is the regulation of visitors over the years. First of all, the number of visitors is quite low compared to the other 12 Spanish National Parks, which receive approx. 10 million visitors each year. The Cabrera National Park is also the only National Park that has seen decreasing numbers of visitors over the last years. This is mainly because it is not so easy to visit the Archipelago (at least a boat ride of 1,5 hours with a normal boat) and it is quite expensive: 35 euro per person on a private charter boat, food not included.

In 2010 there were 65,000 visitors to the Cabrera Archipelago and 65% of those

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<sup>8</sup> CPUE: Catch per unit effort

visits took place between June and August. Anchoring is forbidden but buoys and mooring lanes have been installed, Diving is only allowed in two areas and there is a maximum of three boats a day, weekend sailors need to apply for permits. Ferries for tourists can only bring 200 visitors per day (300 visitors in August).

### **Exchange of information**

From its designation, the Parque Nacional Marítimo Terrestre del Archipelago de Cabrera was part of the network of the now 13 Spanish National Parks. Although the PNMTAC is the only marine National Park, information about specific cases, scientific information, problems, ... is exchanged during annual meetings and workshops. Those meetings have now been put on a low level, as part of the budget cuts. The Cabrera National Park also participates in a working group from the National Parks that wants to create a booklet with good management and surveillance practices. There have been official and non-official (e.g. during private holidays) visits to other National Parks.

Through the Network of Spanish National Parks, Cabrera is member of EUROPARC and information is exchanged through conferences and workshops. In April 2012, some employees from the Lastovo National Park (Croatia) will visit Cabrera National Park to learn about the management.

Occasionally, the PNMTAC has contact with the Network of Spanish Marine Reserves.

The Cabrera National Park has also been involved in the MedPAN Network since the beginning, and they have worked together on some projects. There has been a lot of exchange of information between members of MedPAN, e.g. on the evaluation of divers, cave-communities, ecological assessments or alternative ways of financing. In November 2011, the Cabrera

National Park spoke about the pros and cons of a visitor centre on a MedPAN workshop in Croatia.

Due to budget restrictions, conferences and workshops are now cancelled, unless venues are payed by the organizers.

### **Volunteers**

Every year volunteers work in the PNMTAC through NGOs. There is accommodation in place for maximum eight volunteers. The work that volunteers can do is somehow limited by the fact that it is illegal to assign work to volunteers that can be done as well by payed laborforces. Volunteers mainly help with guided tours, monitoring and cleaning activities.

### **My work**

I met Mr. Jose Amengual, Scientific coordinator, in the Interpretation Center in Colonia St. Jordi on Tuesday the 24th of January. Mr. Amengual answered on all my questions and explained me in particular the financial problems that the Parc Nacional de Cabrera is currently facing. He showed me around in the aquarium, where more than 4,000 fishes and invertebrates are exhibited. An excursion to the Cabrera Archipelago, 20 km from the closest harbour on Mallorca, was not possible due to seasonal and financial issues.

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Interview with Mr. Jose Amengual

Renones O. 2007. Monitoring of groupers in an MPA with fisheries management: Cabrera National Park. PPT. MedPAN



ecological anchoring buoys are installed during summer – red buoys for dive vessels and white buoys for other vessels). Spearfishing and harvesting of products from the sea are forbidden in the entire reserve. There is also a maximum speed limit in the reserve: 5 knots within 300 m from the coast and 8 knots in the rest of the reserve. The reserve and its no-take zone are demarcated by four yellow buoys and two yellow terrestrial beacons. Two of those buoys also contain thermometers and other scientific sensors.

### Importance

The coralligenous reefs are the most important habitat-type of the reserve and they form extensions of the many rocky outcrops along the six kilometers long coast. Caves and cracks exhibit many different types of life, with a wide variety of colours.

In total, more than 1,200 animal species and 500 plant species have been observed in the Réserve Naturelle Marine de Cerbère-Banyuls. Most common are different types of molluscs, sponges, green spoonworms and fish such as groupers (*Epinephelinae*), *Sciaena umbra*, Common dentex (*Dentex dentex*), *Diplodus sargus*, *Diplodus cervinus*, (*Phycis phycis*, lobster (*Homarus gammarus*), amberjacks (*Seriola dumerili*), barracudas (*Sphyraenidae*) and *Carangidae*. Two marine plants can be found in the reserve: Posidonie meadows up to depths of 15 m and *Cymodocea*. Water depths can reach up to 60 meter.

In total, 49 species are subject to some kind of protection (national, European or international legislation), from which the most well-known are Posidonia, red corals, *Pinna nobilis*, Mediterranean slipper lobster (*Scyllarides latus*), rays and the common dolphin.

Dolphins and porpoises (*Balaenopteridae*) are occasionally observed, and even a

group of tens of dolphins was observed two years ago.

### Threats

Biggest threats to the marine reserve of Cerbère-Banyuls are general fishing pressure and intense use by different stakeholders.



**Above:** View at the beaches of Tancade, from the Cap Réderis (© Robbert Casier).

**Below:** One of the boats from the reserve, in the harbour of Banyuls-sur-Mer (© Robbert Casier).

Although controlled, fishing remains a general threat to the marine reserve. There is a maximum of 15 artisanal or professional fishing vessels, while there is no limit for the number of recreational vessels. Plenty of data about the total

number of extracted biomass is available, e.g. two tonnes is extracted by recreational fishing. There is a long tradition of some professional fishermen that are not cooperating with the reserve. Other fishermen are cooperating and have proposed to increase the minimum size for some fish.

A big threat in general is that the reserve is relatively small (650 ha) but used intensively by several stakeholders. Each year, approximately 180,000 people visit the marine reserve, among which 13,000 scuba divers (20,000 dives), 20,000 visitors of the underwater trail and 1,500 recreational vessels (80% from the region). Number of dives and divers has increased from 6,000 – 6,000 in 2001 to 13,000 – 20,000 in 2011. A maximum of 15 boats are authorised to fish in the reserve and this maximum was reached for the first time in 2011. Eleven cases of spearfishing have been reported in 2011. There are also some problems with foreign boats (the reserve is close to the Spanish border) that enter the reserve with excessive speed.

### **Management gaps**

There are no real management gaps.

### **Success stories**

The three biggest success stories are dealing with the underwater trail, ecological anchoring and the reserve effect.

An underwater trail was installed in 2001 and is open to the public every summer in July and August. All equipment (buoys, underwater pannels, information point, post EHBO, access disabled persons) is put in place and cleaned by the staff of the Reserve. The number of visitors has risen from an annual 10,000 in the early years to 20,000 visitors in recent years. The Reserve is monitoring the impact of the trail on the marine life and data about general

satisfaction and observed fish is collected (a rapport is being finalized). Fire-fighters are present at the trail each day. Visitors can rent equipment such as fins, masks, an underwater booklet and a FM tube. The latter is a tube with an antenna that receives radio-signals and transmits those through the mouthpiece, which are resonated by the human body enabling users to hear the explanation. Special infrastructure to make sure that disabled persons can reach the sea are installed.

The marine reserve of Cerbère-Banyuls has an intense pedagogic programme since 2011, in which there is an intense collaboration with schools. The pedagogic programme lies in line with an environmental communication programme that has been initiated by the Regional Government. There is also collaboration with the Association LabelBlue, that develops pedagogic programs. The marine reserve welcomed 1,050 students (42 classes) during the scolar year 2010-2011. A visit to the marine reserve is often combined with a visit to the aquarium of the Arago Laboratory, just next to the harbour.

The reserve has been protected for almost 40 years, and this has resulted in an increasing biodiversity and spillovers to surrounding areas<sup>9</sup>.

### **Exchange of information**

There is an annual meeting of all Natural Reserves, alternating in France and the overseas territories, where there is an intense contact between the managers of

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<sup>9</sup> Goni R., Adlerstein S., Alvarez-Berastegui D., Forcada A., Renones O., Criquet G., Polti S., Cadiou G., Valle C., Lenfant P., Bonhomme P., Perez-Ruzafa A., Sanchez-Lizaso J.L., Garcia-Charton J.A., Bernard G., Stelzenmuller V., Planes S. 2008. Spillover from six western Mediterranean marine protected areas : evidence from artisanal fisheries. *Mar. Ecol. Prog. Ser.* Vol. 366:159-174

each site. There are also contacts through the forum of MPA's in France and through MedPAN. Some members of the staff have previously worked for other French National Parks or Naturel Reserves, and information is thus exchanged through them. Contacts are more intense with the MPA's that are nearby, such as Port-Cros, Cote Bleu or Cap d'Agde. Besides contacts with other French MPA's outside Europe (such as la Réunion, Guadeloupe, ...) there are no contact outside Europe.

The marine reserve Cerbère-Banyuls is not a member of EUROPARC.

### **Volunteers**

The reserve does not work with volunteers, due to difficulties with insurance (for e.g. patrols on a boat or use of dive-equipment) and because 'Saizonniers' are preferred.

### **My work**

I visited the marine reserve of Cerbère-Banyuls on Friday the 27<sup>th</sup> of January. I met the five permanent employees: Mr. Jean-François Laffon (Conservateur), Mr. Jean-François Planque (Pedagogic coordinator), Mr. Frédéric Cadene (Technical coordinator), Mr. Jérôme Payrot (Scientific coordinator) and Mrs. Virginie Hartmann (Stakeholder coordinator). Mr. Planque answered my questions and showed me around at the offices and port (information center, boats and equipment). I also visited the beach of Peyrefite, where the underwater trail is installed during summer months, the cape of l'Abeille and the Cap Réderis, from where almost the entire marine reserve can be observed. In the weekend, I dove just outside the marine reserve where I witnessed the corraligenous reefs and some of its inhabitants (lobsters, crabs, green spoonworms).

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### **The marine Natura 2000 site Posidonies du Cap d'Agde**

#### **Introduction**

The marine Natura 2000 site Posidonies du Cap d'Agde (6.152 ha) was established in 2008, under the impulse of the non-profit "Association de Défense de l'Environnement et de la Nature des pays d'Agde" (ADENA). The Posidonies du Cap d'Agde officialy became a marine protected area when french law was changed so that it acknowledged Natura 2000 sites. 25,000 divers come to Agde each year, but it is not known how many of them dive in the Posidonies Cap d'Agde.

#### **Management**

The government department "Le Littoral du Conservatoire" owns the marine site, and gave the right to manage to ADENA, which does so in close collaboration with all relevant stakeholders. ADENA is an NGO that was founded in 1976 by Renaud Dupuy de la Grandrive. This organisation originally only managed the National

Natural Reserve of Bagnas but has also been a driving force behind the designation of the marine Natura 2000 site.

There are currently nine permanent employees, from which three are working full time on the marine Natura 2000 site. Students and volunteers are involved regularly, and every summer approximately four "saisonniers" are hired. Staff from the marine site are based at an old wine farm in the National Natural Reserve of Bagnas (owned by Le Littoral du Conservatoire), together with their terrestrial colleagues. Only one of the buildings is currently used to accommodate the offices, kitchen and small dormitory that is used by students or volunteers. There are however plans to renovate some of the other buildings and create a 'Maison de la Reserve' and a classroom for student groups. Plans are being developed to create a 'House of the Marine Site' in the harbor and the local municipality of Agde has already agreed to provide the building. The marine team also owns a boat, terrestrial vehicle, diving equipment provided through a partnership with Scuba Pro and underwater cameras. The website is currently being updated.



**Above:** Map and information brochure from the marine Natura 2000 site Posidonies Cap d'Agde (©ADENA).

The total budget for the terrestrial and marine unit is 650,000€, from which a vast majority is coming from government

sources (national and regional governments, Europe) but there are also some revenues from the underwater trail.

A management plan is available and is being updated every six years.

Besides the legislation that applies on all French waters (e.g. the 300 m line that forbids spearfishing or overspeeded vessels), the marine Natura 2000 site has no major restrictions. This means that dialogue with stakeholders is the only way to induce changes.

During summer, ecological buoys are installed for diving vessels.

### Values

There are three major habitat-types in the marine Natura 2000 site Posidonies du Cap d'Agde: the predominant sandy banks, the meadows of *Posidonia oceanica* and associated *Pinna nobilis* and the coralligenous reefs.

The coralligenous reefs are associated with algae, sponges, echinoderms, bryozans (*Myriopora truncata*, *Pentapora*), mussels (*Lithophaga lithophaga*), lobsters (*Palinurus elephas*, *Homarus*) and fish as *Phycis phycis* and *Diplodus cervinus*.

In 2010, a total of 39 different fish species were counted, predominantly *Sparidae* and *Labridae*. The red mullet (*Mullus barbatus*), sea breams and porgies (*Sparidae*), and rock snails (*Murex*) are economically the most important species that are extracted from the MPA. Artificial reefs have been put in place to increase fishing stocks.

Dolphins are sometimes observed. In 2010 three *Stenella coeruleoalba* and one bottlenose dolphin (*Tursiops truncatus*) were observed.

The Natural National Reserve of Bagnas, an important breeding site for seabirds, is located just next to the marine Natura 2000

site. More than 240 different bird species live in the Reserve and more than 10,000 birds reside in the Reserve during summer.

### **Threats**

There are no major immediate threats that can be addressed by ADENA. There were some problems with water quality in the past, but these problems have been solved, partially under pressure from the big number of tourists that visit Agde in summer.

Warmer sea-water temperatures have already caused some gorgonians to die, but managing this problem (global warming) lies outside the scope of ADENA.

There is a constant small risk of destruction of the corraligenous habitats due to fishing (nets, anchoring). Corraligenous reefs, hosting a wide variety in marine life, are attracting fishermen thus increasing the risk of mechanical destruction. ADENA is working together with some fishermen to experiment with different kinds of fishing gear to minimize impact on the reefs.

### **Management gaps**

The biggest management problem is the delicate balance between all stakeholders (recreational and professional fishermen, divers, anglers, jetski's, ...) and how they all use a relatively small marine area. There are no zones where special protection measures apply and this can cause conflicts. The biggest challenge for the future is to find a way to redistribute marine activities and protect sensitive zones at the same time.

### **Success stories**

The attitude towards the marine Natura 2000 site has reversed completely. In the beginning, everybody was against the

designation of a marine site: fishermen, politicians (government and opposition) and local inhabitants. Only some divers were in favor. The Posidonies de Cap d'Agde are now fully supported by the local community, except for some fishermen. ADENA is now regularly making headlines in the local papers and is asked to speak at local meetings.

In 1995, ADENA created an underwater trail, one of the first in France and the world. Through five buoys with ecological moorings, visitors can explore five different marine habitats. The underwater trail was relocated to a different spot in 2007 and is now 150 meters long with an average water depth of five meters. People can rent snorkels, flippers, masks, dive suits, digital camera's and an information booklet for 12€ a person. Guided excursions are possible from June to September and more than 4,000 people participated in this program since 2007. Every year approximately 10,000 people visit the underwater trail on their own.



**Above:** View at La Conque (© Robert Casier).

**Below:** Fishing vessel entering the river Grau at Grau d'Agde, the western limit of the marine Natura 2000 site (© Robert Casier).

Since there are no special restrictions for any kind of fishing, the only way to influence fishermen is by intense dialogue. The relation between ADENA and the fishermen is generally good. Especially a project from the last years has been successful. It incorporates three parts: (1) A positive re-evaluation of the fishermen's profession; (2) Involve fishermen directly in gathering scientific data that is useful for management of the MPA; and (3) Investigate alternative ways of selective fishing. Most of the fishermen are cooperating and have already agreed to place information placards about their profession, the marine life and the MPA just next to the fish market.

There are also plans to install a no-take zone during two-three months in the future.

Success story in the pipeline is the building of the "Sea Explorer II", a 20 m long catamaran that will serve as an eco-tourism and scientific vessel that will operate in many different marine sites in Southern France. The private sector is involved.

### Exchange of information

There are many contacts with universities, the forum of French marine protected areas (meeting 1x per year), the MedPan Network and the Network of marine Natura 2000 sites. Posidonies Cap d'Agde is no member of EUROPARC.

Exchange of information about scientific, management or juridical issues is performed, but mainly with the closest marine reserves / marine protected areas in Southern France. Expensive underwater camera's are bought and used together with some MPA's. There is no real exchange of staff, but the staff of Posidonies Cap d'Agde is participating in annual grouper counts in the marine reserve of Cerbère-Banyuls.

Several MPA's from Spain and the rest of the world have already asked for expertise, for example about the underwater trail. Organisations sometimes request the expertise from the marine site, e.g. when making a booklet about underwater trails.

There is currently a lot of exchange of information through MedPAN, from which the director of ADENA is one of the founding members.

Together with two other marine protected areas in Southern France, the MPA of Posidonies du Cap d'Agde is making a booklet about the monitoring of Posidonia. It is not only more efficient to gather information at the three sites, it is also interesting to see the evolution simultaneously.

During private holidays staff from the marine site often visit other MPA's or contact the management body. Not so many people have done the same to visit the marine Natura 2000 site Posidonies du Cap d'Agde.

There are not many contacts with MPAs at the Atlantic side of France, although the common challenges are probably the same.

### **Volunteers**

Volunteers are rarely used because managing the volunteers is a time-consuming activity, especially during the busy summer season when surveillance, monitoring and scientific research occur simultaneously. There are also the issues of insurance, which are extra complicated when working on a boat or with dive equipment.

### **My work**

I visited the marine Natura 2000 site Posidonies du Cap d'Agde on Monday the 30<sup>th</sup> of January. I met Mr. Renaud Dupuy de la Grandrive, director, Mr. Sylvain Blouet, technical coordinator and Mr. Edouard Chéré, scientific coordinator. They gave me a lot of background information and answered on all my questions. In the afternoon, Mr. Dupuy de la Grandrive gave me a quick tour in Cap d'Agde and le Grau d'Agde, from where almost the entire site can be observed. He also showed me the place where the underwater trail is installed during summer months. It was possible for me to spend the night at the House of the Reserve.

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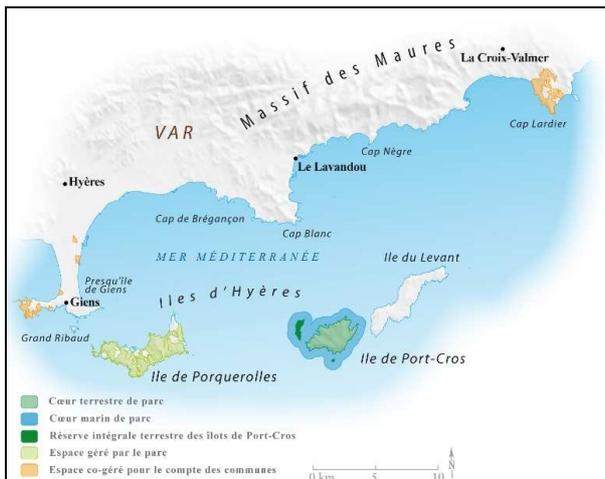
## **Parc national de Port-Cros**

### **Introduction**

The Port-Cros National Park is the oldest marine protected area and Marine National Park in Europe. It was created in 1963 thanks to a donation of Mrs. Marceline Henry and Mr. Paule Desmarais. It comprises all marine waters within 600 m from the shore of the island of Port-Cros (some 1,300 ha), together with 700 ha of land. A permanent surveillance team was installed on the island in 1981. The Park is also a Natura 2000 site (FR9310020). About 300,000 people visit Port-Cros each year, and the entire Park (including Porquerolles and Cap Lardier) receives appr. 1,5 million visitors each year, from which 60,000 divers. Since 1999, the Port-Cros National Park also manages the French part of the Pelagos Sanctuary.

### **Management**

In France, there are several legal ways to protect terrestrial and marine areas. Marine areas can be owned by 'Le Conservatoire du Littoral', they can be protected by coastal law, or by other structures, such as National Parks. There are also international conventions that determine the level of protection, such as the Pelagos Sanctuary. The Port-Cros National Park is the perfect example of how terrestrial and marine areas, both subject to different laws, can still be managed effectively. The Park also manages parts of the neighbouring island of Porquerolles, island of Giens and le cap Lardier (owned by 'Le Conservatoire du Littoral').



**Above:** Map of the Parc national de Port-Cros (© Parc national de Port-Cros).

**Below:** Logo from the park, with the spiral that is used by all French National Parks (© Parc national de Port-Cros).

Approximately 90 people work in the Port-Cros National Park, from which 10 in winter and 20 in summer – among which 'saisonniers' - are permanently working on the Port-Cros island. There are no specific 'terrestrial' or 'marine' rangers, all rangers are involved in all activities (monitoring seabirds, cleaning of terrestrial invasive species, ...). All rangers are allowed to give fines. They are helped by the local police and gendarmery.

There is an annual budget of approximately seven million euros, but there has been a reduction of 20% in 2012 due to the financial and economic crisis. About 80% of the annual budget is coming from government sources, while the rest is derived from own revenues such as port fees. The Park disposes over four boats, diving equipment, apartments on Port-

Cros for the rangers and an office on Port-Cros. The Park is in direct control of the harbour, and no showers, electricity and other commodities have been installed on purpose. There are also no lights, except inside the buildings. Buoys are installed and cleaned by a private company. Plenty of information in french is available at the website: <http://www.portcrosparcnational.fr>.

There is a speed limit of five knots within the first 300 meter, and a limit of 12 knots from the 300 m line up to the 600 m line. All motorised sport vehicles such as scooters or jet skis are prohibited and mooring is forbidden for boats over 30 m long. Scuba diving is limited to six zones where a mooring system is installed at all times, and not more then 40 divers are allowed at the same time at one site. It is allowed to dive in the southern part of the Park but only from the 1<sup>st</sup> of October until the 31<sup>st</sup> of March. All people diving in the Park have to sign a diving charter at the offices of the Park in the harbour of Port-Cros. All recreational fishing is prohibited in the Port-Cros National Park. Professional fishing (including small-scale trawling) is allowed in the northern part of the Park (more then 50 m from the shore), if the boat is registered. Officially 21 artisanal fishing boats are allowed to fish in the Park, but mostly only six to seven boats are using that right. Jean-Claude Ferry is the only artisanal fishermen that is still living on Port-Cros. Ship traffic is prohibited at some sensitive places and also mooring is forbidden at several locations.



**Above:** Two dolphins in the Baie de Port-Man (© Robbert Casier).

**Below:** Artisanal fishing boat from Jean-Claude Ferri, the last fishermen active on Port-Cros (© Robbert Casier).

### Importance

The coastal cliffs offer shelter for seabirds such as gulls (*Laridae*), terns (*Sternidae*), gannets and cormorants (*Phalacrocoracidae*). There is also an important population of 220 couples of puffins residing in the Park. During the reproduction period, almost 90% of the French population of Yelkouan shearwater (*Puffinus yelkouan*) and 25% of cory's shearwater (*Calonectris diomedea diomedea*) stay at the 'Iles d'Hyères' (or 'Iles d'Or').

Half of the seabed of the marine part of the Port-Cros National Park is covered with Posidonia (up to depths of 40 m), that offers shelter for the penn shell (*Pinna*

*nobilis*) and that serves as a nursery ground for more than 70 species including fish such as Salema porgy (*Sarpa salpa*), white seabream (*Diplodus sargus*), chapons (*Scorpaena scrofa*), wrasses and invertebrates such as sea urchins, octopuses and seastars.

In the deeper areas we can find coralligenous reefs that harbor yellow and red gorgonias, green spoonworms (*Bonellia viridis*), spirographes (*Sabellidae*) and two meter long eels (*Anguilliformes*). Brown groupers (*Epinephelus marginatus*), drums (*Sciaenidae*) and common dentix (*Dentix dentix*) are also abundantly present. Dolphins are occasionally observed in small groups.

In total, over 140 bird species, 180 fish species, 260 species of crustacean, 90 species of sponge, 50 species of echinoderma, 170 species of mollusc and 500 species of algae are present in the park.

### Threats

The biggest threat to the marine part of Port-Cros is the high number of visitors and the associated risks. There are only two hotels on the island but 9,000 people annually spend the night on a boat. During July and August, Port-Cros can receive up to 3,000 visitors. On some places, anchoring is admitted and although the Park puts great effort on sensibilizing visitors about the potential impact of anchoring on e.g. Posidonia (through e.g. brochures), there still is an impact. Areas where anchoring is allowed have thus been steadily decreasing. The high number of visitors also results in all sorts of pollution.

Spearfishing and invasive species are minor threats. Attracted by large numbers of fish, some spearfishers try their luck. Each year, a few spearfishers are caught by the rangers and an offence is issued straight away.

*Caulerpa taxifolia* and *Caulerpa racemosa*

are the most important marine invasive species, with the potential to change the ecological balance. Rats on the island pose a threat to seabirds, but this threat has decreased as a result from some successful rat-eradication programs.

### Management gaps

The biggest management gaps are related to the decreasing budget and increasing daily costs, and the challenge to find a balance between the many stakeholders and conservation.

The budget has decreased with 20% over the last two years, the costs of electricity and petrol has risen and the park is also responsible for several buildings, for which expensive renovation works need to be carried out.

The balance between conservation and accommodating visitors requires constant evaluation. This is more a general management problem that is inevitable.

### Success stories

More and bigger fish, that is the result of almost 50 years of protection. Many different species have increased substantially over the last decades, as evidenced by scientists, divers and fishermen. A nice example is the population of brown groupers (*Epinephelus marginatus*), which has risen from 93 individuals counted in 1993 to 410 in 2002 and 720 in 2011. In shallow places (10-12 m) the Sars white seabreams (*Diplodus sargus*) have grown to numbers 15 times higher than the original population. The number of corbs (*Sciaena umbra*) has increased sixfold between 1990 and 2005<sup>10</sup>. This rich biodiversity draws approx.

60,000 divers to the National Park (Porquerolles, Port-Cros and Cap Lardier) each year. Several divers have also reported that fish are less scared in Port-Cros, at least compared to Porquerolles where groupers even seem to get disturbed from just hearing the noise of a speargun.



**Above:** Two surveillance boats in the harbour of Port-Cros (© Robert Casier).

**Below:** View from the Fort de l'Estissac (© Robert Casier).

Port-Cros National Park was one of the first MPA's in Europe and the world to install an underwater trail (in 1979). The trail has been in place at the same spot since 1979

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Harmelin J., Ruitton S., 2007. La population de corb (*Sciaena umbra*: Pisces) du Parc national de Port-Cros (France): état en 2005 et évolution depuis 1990 : un indicateur halieutique et biogéographique pertinent. Sci. Rep. Port-Cros natl. Park, Fr., 22 : 49-65.

<sup>10</sup>

<http://www.portcrosparcnational.fr/actualites/parcnational/>

and access is free. The Park also offers free guides to visitors in July and August.

Since protection measures from the Park have benefitted both the local community and biodiversity, there is a general public support for the MPA. Since 2007, plans are being developed to create a big MPA, with the islands of Port-Cros and Porquerolles as core-areas. Large parts of Porquerolles would thus receive the same level of protection (for the terrestrial and marine part) as the Island of Port-Cros is currently experiencing. In the same plan, 11 coastal municipalities would become part of a zone of 'potential protected areas' and an adjacent MPA with a lower level of protection would be created. These plans have been discussed with many stakeholders and political actors and a timeline until 2015 has been set up.

Since the National Park of Port-Cros was established almost 50 years ago, there is plenty of scientific information and image and video footage available. For example, on this website [Film Port-Cros](#), documentaries from in the 70's are available, and there is even an interview with one of the fishermen, Mr. Jean-Claude Ferri, the current last fishermen that is active on Port-Cros.

### **Exchange of information**

There are contacts with other MPA's through the annual Forum of MPA's in France, the network of French National Parks, the Agency of Marine Protected Areas and the MedPAN Network (from which Port-Cros is one of the founding members). Actual exchange of information is mostly done through MedPAN, with workshops and e.g. the publication of a guide for underwater trails, in which Port-Cros shared its experience.

The National Park Port-Cros, the only national park in France that has a marine part (besides the Guadeloupe National

Park), also helped with the creation of the management plan of the 'Parc Naturel Marin d'Iroise' (Atlantic Ocean), established in 2007.

People working for a National Park can also easily apply for jobs in other National Parks in France (including in the overseas territories) and when they change jobs, they take their experience with them, resulting in a constant exchange of information between French National Parks.

### **Volunteers**

Occasionally interns help in the Park, mostly students that are doing so in the framework of their studies ('stage'). At several times a year, beach clean-ups are organised in which students from local schools participate.

### **My work**

I visited the Port-Cros National Park at Wednesday the first of February. I took a ferry to the island, where I was received by Mr. Johann Cerisier, one of the rangers on Port-Cros. He introduced me to the people that were working in the office on Port-Cros, after which I could join a surveillance tour with one of the vessels. During the surveillance tour around the island I was shown the most striking features of the Park: the Island of Bagaud, the Rock of Rascas and the beach of la Palud (where the underwater trail is installed during summer), the Point of la Galère, the Bay of Port-Man where we encountered two baby dolphins, the Island of la Gabinière, ... After lunch, we made a small walk to the fort de l'Estissac, where Mr. Cerisier showed me the temporary exhibition and the view from the top of the castle.

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Interview with Mr. Johann Cerisier

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## MedPAN network

### Introduction

Since 1990, the MedPAN network has brought together the managers of Mediterranean MPA's and has supported them in their management activities. Activities were temporarily ceased between 1996 and 2004, due to lack of funding. In 2004, the MedPAN network was revived by the Port-Cros National Park and WWF France that coordinated an Interreg IIC project with 23 partners in the Mediterranean. In 2007, the first Mediterranean MPA Conference was organized in Porquerolles, France, where MPA managers decided to create a long-term organisation with an independent governance to coordinate the network. MedPAN became a legally independent

structure in 2008 and a permanent secretariat was established in Hyères. The network geared up in 2010 and has been the driving force behind workshops, conferences, newsletters and publications.

### Governance and functioning

The basis of the MedPAN network is the General Assembly of members and partners. Currently, there are 37 members and 15 partners, representing 45 MPA's in 16 countries. Only authorities that manage a MPA are eligible for membership (e.g. National Park, Ministry, City, Regional Government, ...). Each year, the Board of Directors / Bureau is elected and is currently chaired by Mr. Purificacio Canals. The MedPAN Secretary has an annual budget of 900,000 €, from which 35% is used for staff, 25% is used for the call for small projects (see 'Success stories') and 50% is used for actions such as rapports, workshops, conferences, ... Biggest contributors to the programme are FFEM (Fonds Francais pour l'Environnement Mondial), the Agency of Marine Protected Areas, the Prince Albert II of Monaco Foundation and the MAVA foundation. The budget has dropped a little in 2012, because some of the French contributors have to cut their budgets.

### Threats and challenges

The biggest challenge for the network itself is to conserve and enhance the current level of internal communication. The Network tries to keep a close tie with its members in the field, and good communication is invaluable if the network has to represent its members on national, European, Mediterranean and international forums. External communication to the general public and lobbying is also very important. One way of communication goes through a monthly newsletter, on which 4,000 people are currently inscribed.

Other challenges are related with the constant search for funding (mostly because most funding is attracted through small-scale projects from 3-4 years) and to make sure that the MedPAN network works on concrete actions (Call for small projects, workshops, ...).

The biggest threats to all Mediterranean MPA's in general are related with the designation of new MPA's and the lack of management plans and staff in existing MPA's. Most MPA's in the Mediterranean are currently coastal MPA's on the northern coasts (Spain, France, Italy, Croatia, Turkey). There is a clear need to create more MPA's in the High Seas and on the southern coasts (Maremma, Algeria, Tunisia, Libya and Egypt).

In a study executed by MedPAN in 2008 (approximately 100 MPA's participated), it was found that only half of the MPA's had a management plan or staff.

The network has also received several alarming calls from its members about financial problems and in response a special workshop was organized (2010) about alternative ways of financing.

### **Success stories**

The biggest success story is that the MedPAN network is a concrete network with concrete actions: several workshops are organised each year and in 2011 a 'call for small projects' was initiated in which 10 MPA's in the Mediterranean will be awarded 20,000 € for concrete projects.

### **My work**

While I was in Hyères to visit the Port-Cros National Park, I stopped by at the offices of MedPAN, the network of managers of marine protected areas in the Mediterranean. Mrs. Marie Romani, Executive Secretary, introduced me to the rest of the MedPAN Secretary: Mrs. Chloë

Webster, Scientific Officer, Mrs. Magali Mabari, Communications Officer, Mrs. Marianne Lang, Technical Exchanges Officer, and Mr. Bruno Meola, Database Officer. I received a plenty of information, brochures and posters and Mrs. Romani answered all my questions.

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Interview with Mrs. Marie Romani

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## **Area Marina Protetta Isola di Bergoggi**

### **Introduction**

The MPA Isola di Bergoggi was established in 2007 and covers 215 ha of marine territory. The island itself is a regional natural reserve and covers 8 ha. The Natura 2000 site Fondali Noli - Bergoggi IT1323271 overlaps partially with the MPA and is also managed by the municipality of Bergoggi. Approximately 6,000 divers visit the MPA each year and on a typical summer day the nearby beaches receive 3,000 – 4,000 people. The marine cave is visited by 350 persons each year.

### **Management**

The MPA is managed by the local municipality of Bergoggi (1,200 inhabitants).

From the 18 people working for the municipality, two staffmembers are working full-time for the MPA: one director and one person working with a scholarship. In summer, another staffmember is working half-time for the MPA. Enforcement is done by the police.

There is an annual budget of approximately 100,000 €, from which 80% is provided by Italian governments (Italian, Regional, municipality). Twenty percent is provided by own revenues, notoriously from diving (all divers in the MPA have to pay a fee of 3€). Bergeggi is a relatively rich municipality, mostly because many people have a second house here, and are paying taxes. The budget has been reduced with 50% compared to previous years, and this is accomplished by less maintenance (cleaning of the buoys) and less surveillance (the MPA pays less hours from the police).

The MPA has one boat, that is used for scientific research and monitoring, one terrestrial vehicle and a vespa. The entrance to the marine cave is also controlled by the MPA, which organises guided tours in summer. Plenty of information in Italian can be found at the website: <http://www.ampisolabergeggi.it>.



**Above:** Map of the MPA Isola di Bergeggi, with the three different zones (adapted from <http://www.ampisolabergeggi.it>)

**Below:** The vespa that is at the disposal of the MPA Isola di Bergeggi (© Robert Casier).

A management plan is in place and updated every three years.

Like all Italian MPA's the Isola di Bergeggi is divided in three zones. Zone A is a no-

take zone that forms the core of the reserve and where only scientific research and guided scuba diving is allowed. Zone B is the transition zone where some activities are allowed such as swimming, speed limits under 5 knots, recreational and artisanal fishing. Zone C covers the rest of the MPA where almost everything is allowed (e.g. anchoring, speed limit of 10 knots) but controlled. There is also a small zone where no traffic is allowed during the first of May and the 30<sup>th</sup> of September. Two buoys for diving vessels are installed. Industrial fishing is not allowed in the MPA, contrary to recreational fishing (after paying a fee of 60 €, no maximum) and artisanal fishing. Approximately 20 artisanal fishermen are allowed to fish in the MPA (zone B and C) but only three do so.

### Importance

The seabed consists mostly of sandy planes with some rocky outcrops. The calcareous cliffs are full of cracks, crevices and caves, made by karst processes. The 'Marine Cave of Bergeggi' (La Grotta Marina di Bergeggi) is one of the tourist attractions. It consists of a wide main cavity of 15 m, 7 m below the sea surface and 7 m above, connected to several narrow tunnels, other chambers and small brackish lakes.

*Posidonia oceanica*, protected through the Natura 2000 site, covers 83 ha and serves as a nursery ground for fish such as the brown meagre (*Sciaena umbra*), *Bythididae* and cardinalfish (*Apogon imberbis*). Two types of seahorses are quite common: *Hippocampus guttulatus* and *Hippocampus ramulus*.

Also present in the MPA are white and grey corals (red corals can be found just outside the MPA), sponges such as *Clathrina clathrus*, *Condrosia reniformis* and *Petrosia ficiformis*, gorgonians, Bivalves (*Spisula subtruncata*), sea snails (*Luria lurida*), spider crabs (*Herbstia condyliata*), slipper

lobsters (*Scyllarus arctus*), prawns (*Palaemon serratus*) and crayfish (*Palinurus elephas*).

One Mediterranean monk seal (*Monachus monachus*) has been observed in recent years.

### Threats

Main threats to the MPA Isola di Bergeggi are fishing pressure, artificial beach nourishment, coastal development and marine pollution.

Recreational fishing is the biggest threat to the MPA. Since fishing is part of the Ligurian culture, imposing strict regulations would undermine the community's support for the MPA. Anonymous interviews have shown that many recreational fishermen have caught protected species and do not respect minimum sizes. Spearfishing is illegal, but two or three people are arrested each year by the maritime police.



**Left:** The landmark at Bagni Stella Maris that delineates the start of the MPA (zone C) (© Robbert Casier).

**Right:** The Grotta Marina di Bergeggi (© Robbert Casier).

One public beach is located inside the MPA and several other beaches are in its vicinity. In summer, up to 4,000 people sometimes visit one of those (relatively) small beaches each day. To please those beach visitors, many of the beaches are

artificially nourished. Monitoring programs in collaboration with the University of Genova have shown that this increases turbidity in the MPA, affecting its marine life.

The harbour of Vado Ligure is located 5 km from the MPA Isola di Bergeggi and potential extensions could have an impact on the MPA. Some interesting zones (containing e.g. red corals) just in front of the harbour have been found in recent years and those could be added to a potential extension of the MPA. This would even increase the impact of coastal development on the MPA.

Since Isola di Bergeggi is in the vicinity of intense beach-use, industry and harbours, there is a risk of marine pollution like bacterial contamination and heavy metals.

### Management gaps

The two biggest management gaps are related to lack of personnel and its lack of visibility due to its small size.

There are now two people working full-time for the MPA, from which one is working on a specific project funded by a scholarship. This means that only 2,5 persons (two full-time, one part-time) are available for activities such as guiding tours in the marine cave, occupying the information point, answering phone-calls, resolving problems, ... This is especially hard in summer, when most of the tourists visit Bergeggi and the MPA.

The second management gap is based on the fact that the MPA Isola di Bergeggi is relatively small (215 ha) and young (since 2007). This results in less attention from the Italian Government, more problems to gain visibility and attract funds, problems to enter funding-programs such as LIFE (where part of the project needs to be funded by own means), ...

## Success stories

Since 2007, the Isola di Bergeggi has focussed its efforts more on people than on fish. First mission of the MPA was to gain confidence from all stakeholders, especially fishermen, the local population and divers. This is now partially accomplished: divers were the first to support the MPA and also the Region and city are now fully in favor. The MPA is now often approached with questions and proposals. A calendar was recently developed, in which information about the marine life and a fish recipe is given.

Plenty of scientific information is available such as habitat maps, maps of the corals and gorgonians, publications and books, ... There is a lot of collaboration with the University of Genova. The MPA Isola di Bergeggi is sometimes referred to as 'the Monte Carlo of Italian MPA's', since its budget is relatively high, compared to its size and the number of inhabitants of Bergeggi. In summer, many Italians come to their second houses and the municipality of Bergeggi receives a lot of money from taxes.



**Left:** The island of Bergeggi (© Robert Casier).

**Right:** The logo of the MPA, with the island of Bergeggi and the caspian gull (*Larus cachinnans*).

Five years of protection has already increased biodiversity. Almost no groupers were observed in 2005, but there are now already several specimens of more than 5

kg. The total biomass of the core zone is five times higher than the biomass in zone B. Zone A has always been richer, but the different level of protection in recent years also played a role. The increased biodiversity, and the maximum depths of 30 m, have attracted many divers.

## Exchange of information

The MPA Isola di Bergeggi has contacts with other Ligurian MPA's and local universities. Information is exchanged, notoriously about specific scientific and bureaucratic problems. There is currently intense collaboration regarding the necessary documents for applications for an increase of the Natura 2000 site (deadline is May 2012 and no boundary changes can be made for the next six years).

There used to be exchanges of staff between Italian MPA's but these initiatives have recently stopped due to lack of funding. The director of the MPA used to work in other Italian MPA's and is still in contact with them. This also enhances the exchange of information.

There are no contacts with other MPA's outside Italy, Isola di Bergeggi is no full member of the MedPAN network but is subscribed on its newsletter. They are also no member of EUROPARC.

There is not so much time to seek contact with other MPA's and a language barrier exists.

## Volunteers

Each year, approximately 15 volunteers help the management team, especially by providing images and video footage. There are also approximately 60 volunteers that help with beach clean-ups, from which most are students from local schools.

More volunteers could definitely be used, but there are problems with insurance. It would also create problems to give volunteers the 'power' to inform local inhabitants or tourists what they can't do. The local municipality also prefers to use contracted people, instead of using 'free labor'.

## My work

I visited the Isola di Bergeggi on Friday the 11<sup>th</sup> of February. I was guided by Mr. Simone Bava, director of the MPA. He showed me the offices and introduced me to his colleagues from the municipality of Bergeggi. He then showed me the main features of the MPA: the Punta del Maiolo, the island of Bergeggi, the buoys and landmarks, the marine cave and other calcareous cliffs, the beaches. In his office, Mr. Bava answered all my questions and showed me some video footage. I also received an information package.

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Interview with Mr. Simone Bava

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## Area Marina Protetta Portofino

### Introduction

The marine protected area of Portofino was designated in 1999. It has a long history of marine research and was the place "where Italy learned to scuba dive". It comprises a marine area of 374 ha and is visited annually by 10,000 boats and more than 40,000 divers. It is a marine Natura 2000 site (IT1332674) and a SPAMI.

### Management

Management is held by a Consortium

made up by the the Provincia di Genova, Municipalities of Camogli, Portofino, S. Margherita Ligure and University of Genova. The Consortium is governed by a Board which assigns a director every four year.



**Above:** Zonation of the marine protected area Portofino. Adapted from [www.portofinoamp.it](http://www.portofinoamp.it).

**Below:** Logo of the marine protected area Portofino.

The director works with seven other people that focus on scientific research, monitoring, awareness and policy. Surveillance is done by the police and the Maritime Authority, and in summer one ranger (paid by the province of Genoa) helps the MPA.

The management team has two boats, used

for monitoring and scientific research or by the police for surveillance. Plenty of information in Italian is available at the website [www.portofinoamp.it](http://www.portofinoamp.it).

The annual budget for 2011 is appr. 240,000 euros, a decrease with 40% compared to the budget in 2008, which was 400,000 euros. About 95% of the budget is coming from government sources.

A management plan is available and updated each year.

The MPA of Portofino has a surface of 374 ha, delineated by 11 light buoys and 10 marks on land. The marine protected area is divided in three zones: a no-take and no-entry zone, a general reserve and a partial reserve. Only scientific research and surveillance activities are allowed in the no-take zone (zone A). In zone B, the general reserve, there is a maximum speed of 5 knots for all vessels; mooring is allowed in certain places; artisanal fishing is allowed for residents of Camogli, Santa Margherita Ligure and Portofino; diving is authorized at 21 dive sites and require an authorisation. Anchoring, underwater fishing and engine driven boats larger than 24 meters are not allowed. Zone C, the partial reserve, is subject to the same regulations as zone B, except that anchoring is allowed (some zones have buoys) and recreational fishing is allowed for residents and non-residents, when they are in possession of a special permit.

### Importance

The coast of the Promontory of Portofino is 15 km long and is often described as one of the most stunning features of the Riviera of Liguria. It is also believed to be one of Italy's most important biodiversity hotspots. The southern coast is made up by submerged cliffs up to depths of 50 meters, occupied by numerous limpets, hydroids, algae, corals, algae, sponges, bivalves,

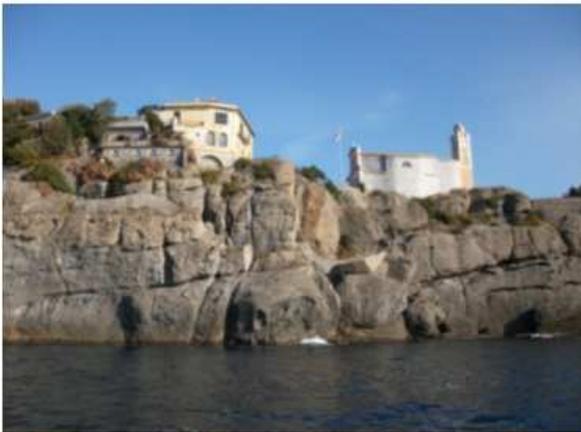
polychetes and bryozoans. The calcareous clastic conglomerates have created a world of ravines, roofs and caves that comprise a high biodiversity. Calcareous concretions have formed for thousands of years and the current animal community is dominated by Bryozoans (*Sertella septentrionalis*, *Pentapora fascilis*, ...) and Madreporaria (*Leptosommia pruvoti*, *Madracis pharensis*, ...). Many sponges (*Oscarella lobularis*, *Spongia agaricina*, ...), hydroids (*Thecocarpus myriophyllum*, more than one meter high) and gorgonians (*Eunicella cavolinii*, *Leptogorgia sarmentosa*) are present. One of the biggest caves is at a depth of 35 meters: the Grotta dei Gamberi, with a two meters wide entrance and a length of 10 meters, which accommodates a rich community of shrimps. The eastern and western coast consist of gently dipping slopes and posidonia beds up to depths of 15 meters.

Portofino, meaning 'harbour of dolphins' is believed to have a stable breeding population of 200 – 300 bottlenose dolphins (*Tursiops truncatus*).

### Threats

The most important threats are sea temperature rise, artisanal and especially recreational fishing, marine invasive species and tourism in general.

During the summer of 1999 and 2003, extremely high sea temperatures caused the death of many gorgonians. It is expected that more of these events will occur in the future.



**Above:** View on the church of Portofino, made from zone B (© Robbert Casier).

**Below:** Some artisanal fishermen at San Fruttuoso, making tonnarella-nets with cocofibers (© Robbert Casier).

About 40 artisanal fishermen are active in the marine protected area of Portofino, and most of them are old and quite reluctant to cooperate with the MPA. In zone B only small scale traditional fishing is allowed under some conditions: fixed nets have to be set perpendicular to the coast, “palangro’s” can only have a maximum of 200 hooks and need to be lowered deeper than at least 40 meters, ...

Tonnarella-nets, a static trap device used since 1600 to catch migrant fish that follow the currents of the Gulf of Paradiso, are allowed in some parts of zone C of the MPA. This is the only surviving “tonnarella” in Italy. In summer, there is a great impact from

recreational fishing. Everybody in possession of a permit can fish in zone C, with a maximum of 3 kg per boat per day. It is however difficult to control recreational fishing since small offences are widespread.

*Caulerpa racemosa*, a green algae, was first found at two points in 2008 but has now spread in the entire B-zone.

Up to 200,000 tourists visit Portofino in the busy summermonths, putting great pressure on the environment (consumption of fish in restaurants, pollution, ...). Many visitors take a tour on one of the big boats. Engine driven boats bigger than 24 m are not allowed in the entire reserve, but they sometimes break this rule to get closer to the cliffs. Engine driven boats between 10 and 24 m can only enter the MPA with a perpendicular course to the coast, but this rule is not always followed. To accommodate the visitors (10,000 private boats enter the MPA each year), anchoring is allowed at some points and *Posidonia* fields are damaged. However, this problem is currently being addressed and places where mooring is allowed will be repositioned.

Four years ago, 60,000 people dove in the MPA, but this number has decreased to appr. 45,000 divers a year.

### Management gaps

The biggest management gap of Portofino is the political structure of its management authority. The Consortium is made up by the municipalities, which have to maintain a balance between the wishes of their voters and what is best for the MPA. For example, it used to be mandatory for divers to read and sign a diving charter, but the Consortium has removed this rule on request of the diving companies. The rules of the MPA are also not recognized by the Regione Liguria.

Although several educational projects are organised in the primary and secondary schools, there is a general lack of awareness in the region.



**Above:** One of the two surveillance boats from the MPA (© Robert Casier).

**Below:** View at the P.ta Torretta (© Robert Casier).

### Success stories

The marine protected area of Portofino has been protected for almost 15 years and a great amount of scientific data is available. Being a biodiversity hotspot, Portofino has attracted many scientific projects. They are currently also involved in some European-funded project, such as the Life-funded project ARION – Systems for Coastal Dolphin Conservation in the Ligurian Sea. The reserve effect has been demonstrated by several studies, e.g. La Mesa et al., (2010) found a higher density, higher

biomass and larger individuals of the sea bream population inside the MPA, compared to not-protected areas.

Ecological mooring zones have been installed in zone C to minimize the impact of anchoring on *Posidonia oceanica* (anchoring is forbidden in zone B). This has been a success and there are now plans to install more mooring zones in zone B and even in zone C.

### Exchange of information

The marine protected area of Portofino has contacts with several other MPA's, especially in Italy. There are also good contacts with MPA's in Slovenia and Spain. Through the MedPAN North project, Portofino collaborated with the creation of monitoring and boating protocols. An MPA in the Balkan contacted Portofino when confronted with abnormal deaths of groupers, and Portofino offered its advice. Portofino is currently also collaborating with the Tosane Archipelago National Park and MPA's in Corsica, about regulation of professional and recreational fishing. This is done in the scope of the MARTEPLUS-program, a conjoint program between Liguria, Tosane, Corsica and Sardinia, that wants to increase innovation and touristic activities.

Through Federparchi, Portofino is member of the EUROPARC Federation.

There are also good contacts with the MPA Isola di Bergeggi, since its current director used to work at Portofino.

People from Turkey and Lybia, working on marine protected areas in their country, have visited the MPA Portofino.

### Volunteers

Each year, students from the University of Genoa (member of the Consortium) help to monitor the human impacts inside the MPA. Not really volunteers, but there have also

been several private initiatives from divers to clean up discarded fishing gear in the MPA. For example, in 2010 a project was initiated in which at least eight to ten kilograms of fishing gear were removed during one hour of bottom time at an average of fifty meters<sup>11</sup>.

### My work

I visited the marine protected area of Portofino on Tuesday the 13<sup>th</sup> of February. I met Mrs. Valentina Cappanera, biologist, in the offices of the MPA in Santa Margherita Ligure, where she introduced me to her colleagues and gave me some general information. We then made a surveillance tour on a boat from the MPA and we were joined by one of the local policemen. I was shown the different zones of the MPA: zone A, zone B and the dive buoys and zone C with the special tuna-nets, the 'Tonnarella'. We briefly visited the municipalities of Portofino and Camogli, and I was introduced to some local fishermen in San Fruttuoso that were just making their sustainable fishing nets with cocofibres. In the afternoon, Mrs. Cappanera answered all my questions and gave me all the information I needed. The last gaps were answered by Mr. Giorgio Fanciulli, Director of the MPA.

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Interview with Mrs. Cappanera and Mr. Fanciulli

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## Parco Nazionale Arcipelago Toscano

### Introduction

The Tuscan Archipelago National Park was established in 1989 and was at its time the biggest marine park in the Mediterranean. It was extended in 1996 with the marine area around Pianozola. It comprises 74,653 ha, from which 75% is marine territory. The Montechristo Island Nature Reserve, part of the Park, received from the Council of Europe the European Diploma of Protected Areas in 2000. The Park is located within the Pelagos Sanctuary, although this has no concrete consequences, and is a UNESCO Biosphere Reserve. The area around the island of Pianoza is a marine Natura 2000 site (IT5160013).

### Management

The Park is managed by a Park Authority made up by 10 municipalities: Comune di Capoliveri, Portoferraio, Campo nell'Elba, Rio Marina, Giglio, Marciana, Marciana Marina, Rio nell'Elba, Porto Azzurro and Capraia. Every five years, the municipalities appoint a Board of 12 members, and a president is assigned by

the Ministry of Environment. The Board and its president decide on all general matters and budget, while the technical department has to accomplish the objectives determined by the Board. The technical department consists of 20 people, from which most work on administrative issues and scientific data-collection (in collaboration with universities). The technical department is assisted by rangers from the Corpo Forestale dello Stato. There used to be approximately 60 rangers that offered help, but this has now been reduced to 30. The rangers especially help during summer when there are permanent patrols of two rangers on some of the smaller islands. The Guardia Costiera (Coastal Police) also offers assistance. The Park pays for the services of the rangers and Guardia Costiera, appr. 100,000 € each year.

Over the last years, the total annual budget was approximately 2 million euros, from which 65% is spend on daily activities (personel, electricity, maintenance, ...). Between 2007 and 2011, the budget decreased with approximately 15% but for 2012, the Ministry has appointed an extra exceptional amount of 1.6 million euros for the Park (reason unknown). Together with some sources from European projects, the budget for 2012 will have almost doubled compared with previous years. Appr. 95% of the budget comes from government sources (mostly Italian State), while the remaining 5% is coming from own revenues (ticket fees and fines, each appr. 120,000 €). A website with plenty of information in English and Italian is available: <http://www.islepark.it/>.



**Above:** A lampara fishing boat (using lights at night to catch fish) in the harbour of Portoferraio, Elba, that is active in the Archipelago (© Robbert Casier).

**Below:** Impression of Elba, which is not surrounded by a marine protected area (© Robbert Casier).

The Tuscan Archipelago National Park exists of seven islands, that are managed in various ways. The two biggest islands, Elba and Giglio, only contain terrestrial protected areas. The island of Montecristo is the only Integral State Reserve (maximum 1000 visitors per year) and is surrounded by two zones: zone 1 (maximum protection) where only scientific research is allowed (with a permission from the Ministry of Agriculture) together with some ferryboats, which are authorized to transport visitors in a straight line to Cala Maestra. Zone 1 covers the area from the coast to one mile perpendicular on the

coast. In zone 2, fishing is authorised for locals (and owners of second homes), whereas trawl-net and underwater fishing are forbidden. Visiting the island is free, since it is a State Reserve. Montecristo is the best protected island from the Archipelago.

The island of Pianosa is surrounded by a marine Natura 2000 site (IT5160013), which corresponds with the marine protected area. There are only five permanent residents, but more people live on the island in summer to work in the restaurants and to accommodate the tourists that visit the island each day (maximum 250). Visits to the island started in 1998. Only one boat has a permission to go to the island (from Marino di Campo, Elba). Snorkelling and swimming is only allowed in Cala Giovanna. Diving was forbidden, but this year five buoys where diving is allowed, will be installed. There is also an inactive prison on Pianosa, where some prisoners still work. A ticket is requested to visit the island.

The islands of Gorgona and Giannutri are partially surrounded by marine protected areas (zone 1 and zone 2). Due to the big depth, installing permanent buoys are too expensive, and it is thus difficult to know in which zone you are. Floating buoys were used in the past, but they were moved by fishermen. Giannutri is only located 10 km from the closest mainland, and the zones that are not subject to protection measures are flocked with private vessels in summer. Giannutri is also a private island, and there are thus no toilets or garbage cans, resulting in local pollution.

The island of Gorgona exhibits an active prison, where approximately 40 prisoners work. A special permission from the Ministry of Justice is required to visit the island, and a small ferry only goes to the island every Tuesday. There is some confusion about the status of Gorgona and about who has direct control: the Ministry

of Justice and the prison, or the Tuscan Archipelago National Park. The Park has little information about what is happening on and around the island.

The island of Capraia is surrounded by a zone 1 and zone 2 protection, except for a small area towards the only harbour: Porto del Punto Vecchio. Approximately 400 people live on the island, and there is no limit regarding the number of tourists.

With a surface of 2,2 ha, the island of Giglio is the second biggest island of the Tuscan Archipelago. No marine protected areas are in place, about 1,000 permanent residents. A plan for an MPA was proposed in 2009 but cancelled after the local elections.

### **Importance**

The islands are characterized by diverse natural landscapes and as a result of its geological history some of the islands have volcanic origins while some are composed of granitic, metamorphic or sedimentary rocks.

Many seabirds reside and migrate through the Park, among which the rare Corsican seagull (*Larus audouinii* – symbol of the Park - 15-20% of the Italian population), cory's shearwater (*Calonectris diomedea* - 2% of the Italian population), Mediterranean shearwater (*Puffinus yelkouan* - 15% of the Italian population and 5% of the global one) and the cormorant shag (*Phalacrocorax aristotelis* - 3% of the Italian population). A wetland area (Ramsar Convention) is present on one of the islands, where plenty of birds can be observed.

In 2009, a male and female Mediterranean monk seal were observed near Giglio for the first time. It is suspected they breed in caves with underwater entrances, where they are sheltered from humans.

Rocks are covered with the endemic seaweed Neptun's shaving brush (*Penicillium capitatus*), *Acetabularia acetabulum* and *Padina pavonica*. Sea-urchins (*Paracentrotus lividus*), starfish (*Echinaster sepositus*), octopus (*Octopus vulgaris*), sea-ears (*Haliotis lamellosa*), fan-worms (*Sabella spallanzani*), sea-fans (*Eunicella cavolinii*), lobsters (*Palinurus elephas* and *Scyllarides latus*), morays (*Muraena helena*) and red coral (*Corallium rubrum*) can be observed.

Common fish are the common rainbow wrasse (*Coris julis*), the turkish wrasse (*Thalassoma pavo*), the two banded bream (*Diplodus vulgaris*) and gilthead bream (*Sparus auratus*), the damsen (*Chromis chromis*), the painted comber (*Serranus scriba*) the red mullet (*Mullus surmuletus*), brown groupers (*Epinephelus marginatus*) and the bass *Dicentrarchus labrax*.

Sandy seabeds are covered with meadows of *Posidonia oceanica*, which serve as a nursery ground for fish, tunicates, penn-shells (*Pinna nobilis*) and seahorses (*Hippocampus hippocampus*).

Rare species that can be observed occasionally are the swordfish (*Xiphias gladius*), the tunafish (*Thunnus thynnus*), the sun fish (*Mola mola*) and cretaceans such as dolphins (*Delphinus delphis*), bottlenoses (*Tursiops truncatus*), orquals (*Balenoptera physalis*) and sperm-whales (*Physeter macrocephalus*).

### Threats

The most important threats are dealing with the effects of tourism, illegal fishing, marine transportation – oil spills, and invasive species.

The Tuscan Archipelago is a popular tourist destination in summer, especially for Italian tourists. While there are only 20,000 permanent residents on e.g. Elba, almost

200,000 people are present on the island on a typical summer day. Pianosa has appr. five permanent residents but a maximum of 250 tourists per day visit the island in summer. The effects of tourism are mainly (1) a general disturbance of the environment (e.g. people walking outside the trails); (2) an increase in the number of recreational vessels that visit all the islands; and (3) the high consumption of fish in restaurants, that is a driving force for illegal fishing.

Illegal fishing and spearfishing are an important threat, as evidenced by the many abandoned nets that have been found in zone 1. The police is controlling the area around the islands by radar, but there are many 'radar shadows' that prevent full coverage. Recreational fishing also puts great pressure.

The Tuscan Archipelago National Park is subject to a high shipping activity, notoriously due to the different ferries that connect the islands, and the traffic from the industrial harbour of Piombino. This intense ship traffic increases the risk for accidents and oil spills. The Costa Concordia, which sunk just next to the island of Giglio on the 13<sup>th</sup> of January 2012 has resulted in an oil spill.

Terrestrial invasive species have an impact on the marine life. Especially black rats, which eat the eggs and chicks of many different bird species, and goats, whose eating habits cause erosion are problematic. Rad eradication programs are very expensive.

### Management gaps

The most important management gaps are the political structure of the management authority, the general aversion towards the Park and the complicated structure that hinders enforcement activities and gathering of scientific data.

The management authority is made up by people elected by the local municipalities, which are not always in favor of the Park. This means that people that want to diminish the Park's activities are member of the Board, and have the power to block propositions. The technical department (administration, communication, monitoring) can only accomplish the objectives determined by the Board, although those objectives are not always in the interest of the Park. This causes a great deal of frustration in the technical department, who can't do what they want to do and who have to spend part of their time on 'politics' instead of on nature conservation.



**Above:** Logo of the Parco Nazionale Arcipelago Toscano, made up by a wave and the rare Corsican seagulls (*Larus audouinii*). Adapted from <http://www.islepark.it/>.

There is a general aversion towards the Park in the Tuscan Archipelago, created by the impression that the Park limits the money that can be made out of tourism. Some divers are against the Park, because the unspoiled area of Montecristo is closed for divers; some fishermen are against the Park because they want to limit the total number of caught fish / specific species; and many local inhabitants think that more protection will result in less tourists, the main source of revenues on the islands. In 2009, elections on Giglio were won by a party whose main point was the prevention of the creation of an MPA around the island. The mayor of Giglio also blamed the MPA as the cause of the Costa

Concordia accident, although currently no MPA exists in Giglio's vicinity.

The structure of the Park is complicated: Gorgona belongs to the municipality of Livorno (main land city) and is an active prison controlled by the Ministry of Justice, some islands have a small maze of zones with different protection levels, the wardens fall under the authority of the Corpo Forrestale dello Stato and not to the Park, ... This in general results in lack of enforcement (which requires coordination between many different actors) and lack of scientific data (e.g. what is happening at Gorgona, how much is fished at other islands, ...)

### Success stories

A rat eradication programme has been successfully completed in 2008 on the island of Gianutri, the biggest Mediterranean island subject to a similar program. A similar programme has now been initiated on the island of Montecristo, where it is estimated that 700 chickens of shearwater are killed annually by the black rats (not to mention the eggs). In 2005, when works began on Gianutri, about 10,000 black rats (*Rattus rattus*) were living on the 240 ha island. About 1,000 rodenticide baits were placed every 50 meter, and the campaign was terminated in 2007.

### Exchange of information

There are contacts with other national parks and marine protected areas in Italy. Other sites have asked the Parco Nazionale Arcipelago Toscano advice about the catch of wild bores (1,500 wild bores are caught each year) and project proposition (the park has been quite successful in attracting funds for specific projects e.g. Life, Arcomar, Comed, ...). The director of the technical unit is vice-president of Federparchi, the Italian

branche of EUROPARC and member of a scientific committee. This has resulted in exchange of information with other MPA's and National Parks in Europe.

### **Volunteers**

Approximately 60 volunteers help in the park, in hotels, infopoints, removal of vegetation, ... Only a few volunteers / students help with data collection but this is limited due to a lack of space and accomodation. There are also some problems with insurance and it is in general very timeconsuming to supervise volunteers / thesis-students.

### **My work**

I visited the Parco Nazionale Archipelago Toscano on Tuesday the 14<sup>th</sup> of February. Mrs. Franca Zanichelli, director, picked me up in Portoferraio in Elba and brought me to the offices of the Park in Enfola. The Park Authority is located in an old 'marfaraggio', where tuna fishing boats and equipment were once stored. She showed me part of the park on Elba, such as the Golfo del Viticcio and area around Acquaviva.

Mrs. Zanichelli then showed me the offices and introduced me to her colleagues. In the afternoon, Mrs. Zanichelli gave me a lot of general information about the Park and its management. I also had the chance to ask her questions.

It was impossible for me to see parts of the marine protected areas, since they are located on the other islands of the Tuscan Archipelago and in winter there are not so many connections with the other islands.

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## **Aire Marina Protetta Isole di Ventotene e Santo Stefano**

### **Introduction**

The marine protected area Isole di Ventotene e Santo Stefano was created in 1997 with three major purposes: (1) environmental protection; (2) conservation of biological resources; and (3) promotion and development of educational and scientific activities. The terrestrial area of the islands of Ventotene and Santo Stefano were designated as a National State Reserve in 1999. The MPA covers an area of 2,799 ha, against 174 ha of terrestrial territory. The borders of the MPA follow approximately the -100 m contour line. An enforcement or monitoring team was not in place up to 2003, when effective management began. The MPA is part of a Natura 2000 site (IT6040019). Approximately 60,000 people visit Ventotene during summer, among which 5,000 divers.

### **Management**

The marine protected area Isole di Ventotene e Santo Stefano is owned by the Italian Ministry for Environment, which has given the right to manage the MPA and the terrestrial natural part to the Municipality of Ventotene.

Three people work full-time for the Park and the MPA: one director, one scientific

coordinator and one person responsible for budget and general issues. The director reports directly to the mayor of Ventotene. A local association provides another two staff-members that work in the museum and information point. Surveillance is done entirely by the Maritime Police (Costa Guardiera), who patrols the MPA by boat in summer.



**Above:** The zonation of the marine protected area of Isole di Ventotene e S. Stefano with the three different zones (adapted from <http://www.riservaventotene.it>).

**Below:** The logo from the MPA, where the form of the MPA is used as part of a fish.

The MPA has an information point in the harbour, where general information for visitors about diving, recreational fishing and other legislations are provided. The main office is in the City hall of Ventotene, where a museum (appr. 10,000 visitors each year) is located in the basement.

There is also an ornithological observation point, where volunteers from the Ventotene Museo della Migrazione ed Osservatorio Ornitologico come to monitor birds in summer months. An electric vehicle is at the team's disposal. There is ample information (in Italian) on the MPA's website:

<http://www.riservaventotene.it>.

There is currently an annual budget of 100,000 euros, but this has decreased gradually over the last years. In 2003, a budget of 1 million euros was available, but this included one-time investments for building the information point and bird observation point. There is now not enough money to accomplish all the goals, and choices have to be made.

A management plan is available, but has not been updated in recent years due to lack of budget that requires cancellation of some projects.

The marine protected area Isole di Ventotene e Santo Stefano is divided in three zones. Zone A has the highest level of protection and only surveillance and scientific research is allowed here. In zone B swimming, navigation for motorboats and sailing or rowing are allowed, while recreational fishing, artisanal fishing and scuba diving require authorization. Zone C allows bathing and snorkeling, navigation, sailing or rowing and anchoring if no Posidonia is present. Recreational fishing and scuba diving requires authorization. Underwater fishing or spearfishing is illegal in the entire MPA.

### Importance

Besides being an important bird area, for local as for migratory birds, the MPA Isole di Ventotene e Santo Stefano has important Posidonia fields (up to 40 m deep), a rich pelagic and benthic biodiversity and habitats ranging from 0 to 100 meters

below sealevel.

More then 150,000 birds from 100 different species pass through the MPA during their migrations between Europe and Afrika. The most iconic seabirds are Cory's shearwater (*Calonectris diomedea*), Mediterranean shearwater (*Puffinus yelkouan*) and the peregrine falcon (*Falco peregrinus*).

The islands of Ventotene and Santa Stefano are remnants of an ancient volcano, and are characterised by many different volcanic rocks that, under the influence of water and wind, now consist of caves and cracks that exhibit a rich biodiversity. You can also find gorgonias, octopuses, eels, leatherback turtles (*Dermochelys coriacea*) and large schools of barracuda's and other fish.



**Above:** The Bay of Paratella (© Robbert Casier).

**Below:** The island of Santo Stefano, with

the prison (© Robbert Casier).

The waters around the islands are very clear, resulting in Posidonia meadows up to depths of 40 m. The Posidonia also serves as a barrier against coastal erosion, since they diminish the force with which waves hit the shores. The Posidonia meadows are an important nursery ground for about 350 species of invertebrates and fish such as amberjacks (*Seriola*), tuna (*Thunnus*) and common dolphinfish (*Coryphaena hippurus*).



**Above:** The electric vehicle that is used by the MPA staff (© Robbert Casier).

**Below:** Some of the boats from the local fishermen, in the old Roman Port (© Robbert Casier).

In summer bottlenose- (*Tursiops truncatus*) and striped dolphins (*Stenella coeruleoalba*), long-finned pilot whales

(*Globicephala melas*), sperm whales (*Physeter macrocephalus*) and fin whales (*Balaenoptera physalus*) can be occasionally observed, while the short-beaked common dolphin (*Delphinus delphis*) and Risso's dolphin (*Grampus griseus*) are rare.

Inside the MPA there are also two WWI wrecks, and some old Roman triremes at depths of 100 m have been discovered recently.

### **Threats**

There are no major threats to biodiversity in general. Smaller threats are problems related with visitors and coastal erosion.

Officially there are 700 permanent residents on Ventotene (Santa Stefano is uninhabited), although in reality only 200 people are living on the island in winter. During the four busiest summermonths, 60,000 people visit the island, from which 5,000 dive around the island. There are minor problems with recreational fishing vessels just outside of the A-zone. Since Ventotene is located at least 30 km from shore and since it is not well known (most tourists are Italians), tourism is a moderate threat compared to other MPA's.

Due to the geological structure of the island (many volcanic layers – plenty of wave action), coastal erosion is a natural phenomenon. One beach had to be closed because part of the cliffs collapsed, and since two young children were recently killed by a fallen rock, extra precautions have been taken.

### **Management gaps**

The biggest management gaps deal with bureaucracy and lack of adequate financial means.

The bureaucratic nature of the relation between the MPA and the Ministry for

Environment has caused a lot of frustration. Three years ago, the MPA sent a proposal to change legislation to the Ministry, but they have not responded yet. The proposal tried to find a solution for the fact that no money can be asked to visit the island (since it is a Natural State Reserve already maintained by public money), or that one should be very creative to find a legal way to ask money for e.g. diving and recreational fishing-activities.

Since its creation, the budget has decreased systematically, and now even more by the current financial problems in Italy. This means that one of the major tasks of the MPA is to look what can be done with little money, and thus choices need to be made such as cancelling the update of the management plan.

### **Exchange of information**

There are some contacts with other MPA's in Italy, especially about how to solve problems with legislation, policy and bureaucratic issues. Until two years ago, there were annual meetings with representatives from all Italian MPA's, but these meetings have been ceased due to financial problems.

There are no contacts with other MPA's in Europe or the world. Isola de Ventotene e Santo Stefano are member of EUROPARC and Federparchi. There is a clear wish to learn from older MPA's, although it is not clear which topics would be most interesting.

### **Success stories**

Plenty of data about the extracted biomass is available. The MPA is working closely with divers and recreational fishermen. Recreational fishermen are sharing data about the species they catch, and their size.

## Volunteers

There are no volunteers working in the marine protected area, due to a lack of interest.

## My work

I visited the marine protected area Isole di Ventotene e Santo Stefano on Thursday the 16<sup>th</sup> of February. The island is not so easy to reach in winter, so I took the ferry from Formia to Ventotene in the morning, and had a few hours to visit the island. I was guided by Mr. Antonio Romano, scientific coordinator of the MPA. He took me in the MPA's electric vehicle and showed me the ornithological monitoring center, the information point in the harbour, the museum and the most important features of the island: Capo Nero and the Bay of Paratella, Cala Battaglia, Cala Nave and the old Roman port. In his office, he provided me with all the information I needed, answered all my questions, showed me some habitat-maps and video-footage. I received an information package with brochures, books and t-shirts.

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<http://www.riservaventotene.it>

Interview with Mr. Antonio Romano

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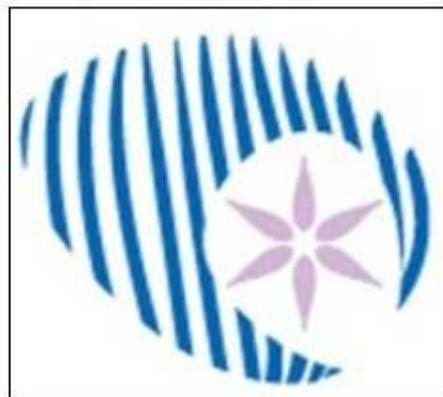
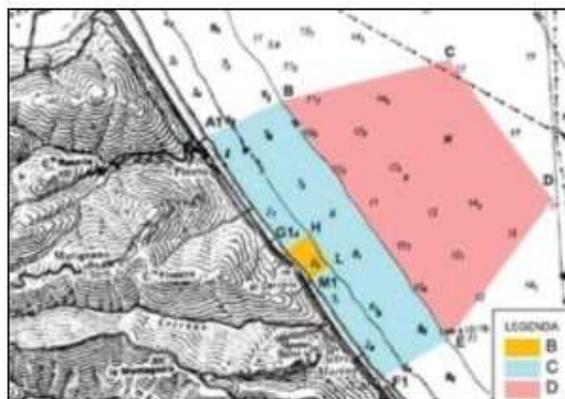
## Area Marina Protetta Torre del Cerrano

### Introduction

The marine protected area Torre del Cerrano was designated in 2009 by the

Department of Environment and Protection of Natural Territories. It's main purpose was to protect an area containing a large marine habitat of sandbanks, a reef habitat around the old roman harbour and five kilometers of coastal dunes. The marine area is now protected from turbo-blower fishing (so called draga idraulica or turbosoffiante), a technique that is used to catch the *Chamelea gallina*, a typical Adriatic shell (so called "vongola") and during which the entire seabed is destroyed.

The MPA has a surface of 3,700 ha, includes a sandy dune area and extends 3 nautical miles in sea.



**Above:** A map of the MPA Torre del Cerrano with the three different zones (adapted from <http://www.torredelcerrano.it>).

**Below:** The logo of the MPA, made up by two rare species typical for the MPA: the plant Rolli's sand crocus (*Romulea Rollia*) and the Adriatic trivium shell (*Trivium*

*Multilirata*).

## Management

The MPA Torre del Cerrano is managed by an Association of the Municipalities of Silvi and Pineto, the Province of Teramo and the Region of Abruzzo. The Assembly is made up by the presidents and mayors of the above-mentioned institutions.

Three people currently work for the MPA, one director and two assistants. They share a building with the local tourist agency, just next to the city hall of Pineto. There is a van that is used in summer especially for educational activities. An annual budget of 100,000 € is available, from which 90% is provided by the Municipality and the Ministry for Environment and 10% is provided by own revenues such as renting umbrella's and entrance tickets for the Tower del Cerrano (1€ pp). The MPA Torre del Cerrano was created amidst an atmosphere of financial problems and has thus never received adequate financial means for e.g. its establishment. In February 2012 one of the tents used for educational activities has been destroyed by a big storm. Three electrical vehicles are also at the MPA's disposal.

There is not yet a management plan. At its creation, the MPA applied for the status of European Site of Importance and when confirmed, the province of Abbruzzo will provide financial means to pay for a management plan. Plenty of information in Italian and English is available at the website: <http://www.torredelcerrano.it/>.

The MPA is made up of three zones: a B-zone (general reserve) with the highest level of protection, a C-zone (partial reserve) and a D-zone (protected area), with the lowest level of protection. Water-skiing and similar sports, fishing with lights, trawling, fishing with a turbo-blower (to

catch *Chamelea gallina*), underwater fishing and aquaculture are illegal in the entire MPA. Scuba-diving is only allowed in zone B and C when authorized. In zone B there are some limitations for motor boats (depending on their size and ecological motors), ship navigation (max speed of 5 knots) and recreational fishing, which is only allowed for residents of Pineto and Silvi when they use authorized fishing-line and rod.

Walking is the only activity that is allowed on the beach that belongs to zone B.

## Importance

The MPA Torre del Cerrano is comprised mostly of sandy beds, typical for the northwestern Adriatic coasts in Italy. There are also some hard substrates, made by the submerged rocks of the ancient port of Atri and some conglomerate outcrops.

Many pelagic and benthonic species live in the MPA, such as congers (*Congridae*), basses (*Perciforms*), soles (*Soleidae*), white breams (*Cyprinidae*) and clam beds (*Chamelea gallina*). The most iconic species are the rare gasteropod *Trivia multilirata* and the large bioconstructions of *Sabellaria halcocki*. In the last years, some dolphins (*Tursiops truncatus*) have been observed close to the shore.

A strip of 50 meters of sandy dunes also belongs to the MPA, and migratory bird species often stop here. The kentish plover (*Charadrius alexandrinus*) breeds in the dunes and on the beach, where it makes its nest.

## Threats

The most important threat for the marine protected area Torre del Cerrano is marine pollution. The beaches around Pineto are a popular holiday destination, resulting in the presence of pollution, notoriously plastic bottles and little sticks used in ice-creams.

A potential threat could come from future oil-and gas exploration. Some small gas rigs (one pillar) are located just outside the MPA and form no real threat. Several studies are going on to investigate the oil-potential of the region, but the public opinion starts to urge for a halt of oil-exploration.

### Management gaps

The biggest management gaps are related to lack of adequate financial means and political and bureaucratic problems.

The MPA was created in 2009, in the middle of the financial crisis and since then, things have not really been improving. An annual budget of 100,000 € is available, but an one-time amount for the establishment of the MPA has never been attributed, and there is thus a chronic lack of adequate financial sources.



**Above:** Aerial image of the MPA from an eyeheight of 25 m (© 2006 Google Earth).

**Below:** An atypical view from the Torre del Cerrano on the beaches covered with snow (© Robbert Casier).

Since the MPA is still quite small (small budget, only three people), politicians are not involved too much in its functioning. However, it could happen that the president from the Assembly is from a different political party as the mayor of Pineto, and this would cause problems.

An important bureaucratic problem these days is that the Ministry can not give extra money to hire new employees, and they can only be hired when the municipality can provide adequate means for a long-term contract.

### Exchange of information

Torre del Cerrano is no member of EUROPARC. The MPA has been one of the driving forces behind the AdriaPAN network, which is now considering to become part of MedPAN as a regional sub-network. There is exchange of information with other Italian MPA's. When it was created, a visit to the MPA Torre Guacaste was organised in order to show Torre del Cerrano how that MPA was managed. The idea to rent umbrella's also came from that MPA. Advice about regulations, administration and bureaucracy is easily exchanged.

Since this MPA is quite young, it can still learn a lot from other MPA's. Some money to establish monitoring programs could be available soon, and Torre del Cerrano could use advice.



*The van that is used for educational activities and that was purchased through the "Cerrano trade" / The beaches from the marine protected area are covered with shells / The Torre del Cerrano. (© Robert Casier).*

### **Success stories**

A good success story is the fact that the original aversion towards the MPA Torre del Cerrano has changed in a general support for the MPA. At its creation, hotel- and bungalow owners were afraid that the MPA would limit access to the beach and would thus diminish the number of tourists. The fishermen were also against, and even held some protest-actions in which they were deliberately present in the B-zone. They have now accepted the MPA but are not yet its biggest supporters. The hotels now realise that the biggest changes (e.g. jetski's are forbidden) are well appreciated by their core-public: Italian family's with children. The last two years, dolphins have been observed in the MPA and there are even movies on the net where dolphins swim between the people. This is believed to be attributed to the prohibition of fishing, and the dolphins now follow the fish close to shore. Hotel owners have quickly used dolphins to promote Pineto.

Not a real success story yet, but probably one in the making is the creation of a private association (*Cerrano trade*) that

makes it easier to sell T-shirts, organise financial activities, rent umbrellas on the beach. Profits can now be made and invested in the management of the MPA, and there are less rules and less bureaucracy. Last year, the association broke even, but it is expected that starting from 2012 profits will be made (estimated 10,000 €).

AdriaPAN is a network of MPA's in the Adriatic Sea that was created under the impulse of Torre del Cerrano and Miramare. For now, it is mainly a collaboration between like-minded people from Italy, Slovenia, Croatia, Montenegro and Albania. A few workshops have been held. There are now plans to create a permanent secretary (like MedPAN) or to incorporate AdriaPAN as a regional network withing MedPAN. The network has already been usefull to exchange information on environmental topics but especially to propose projects for e.g. European funding (work can be divided, many European funds support transboundary projects).

The kentish plover (*Charadrius alexandrinus*) is a small bird that makes its nest on the beach and in the dunes. Up to two years ago, ornithological monitoring programmes showed that most of the birds were adults, and that there was almost no succesful reproduction. It was found that the reason for this was the mechanical cleaning of the beach at the start of the tourist season, which destroyed all the nests and eggs. A compromise was made between the MPA and the beach umbrella renters, in which they could still clean the beach manually but only on their property. In this way, some parts of the beach were not cleaned. Results were seen directly and last year many new kentish plovers were observed.

## Volunteers

Every year in spring, a big beach clean up is organised in which appr. 300 local residents participate.

## My work

I visited the marine protected area Torre del Cerrano on Friday the 17<sup>th</sup> of February. I was guided by Mr. Fabio Vallarola, director of the MPA. He showed me the beach, that was partially covered with snow at the moment of my visit, the different zones and the information-point on the beach where umbrella's are rented in summer. He then took me to the Torre (tower) de Cerrano, from where you can see the entire MPA and where he answered all my questions. In the tower there are rooms for conferences, presentations, an ornithological research center and a veterinary research group.

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Interview with Mr. Fabio Vallarola

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## Nacionalni park Kornati

### Introduction

The Kornati National Park was established in 1980, and three years later effective management began. Originally the Park also included the current Nature Park Telascica, but because the northern part belongs to the county of Zadar and the southern part to the county of Sibenik, the Park was split up in 1988. It currently comprises 89 islands and a total area of 216,78 km<sup>2</sup>, from which almost 80% is marine territory. About 100,000 people visit the Kornati archipelago each year, among

which 1,000 – 1,500 divers. The Kornati National Park is currently on the tentative list of UNESCO's Natural World Heritage.

## Management

The Kornati National Park Authority is controlled directly by the Ministry of Environment, who owns the marine part of the Park. The terrestrial part of the park is entirely under private ownership (around 620 owners and 25 citizens), which have all signed an agreement with the Park that forbids e.g. construction of new buildings.

There are about 21 permanent employees, from which five are rangers, and 15 seasonal rangers are contracted during summer. The rangers are authorized to intervene and if necessary to arrest people. The Park disposes over two boats that are mostly used by the rangers to patrol, and one sailing vessel that can be used to conduct research and monitoring. The offices of the Park are located at the municipality of Murter. Plenty of information in Croatian and English is available at the website: [www.kornati.hr](http://www.kornati.hr).

The annual budget is about 8 million kuna's (1 million euros), from which 60% is coming from the government and 40% is derived from own revenues, mostly entrance fees. Croatian National Parks are obliged by law to ask an entrance ticket and to try to diversify their income sources. There has been no big impact from the crisis.

In the frame of the MedPAN South project 'Strengthening the network of marine protected areas in Croatia', a management plan is currently being developed and it is expected to be finalized in 2012.

There are four no-take zones where only scientific research is allowed: the area around the islands of Purara, Mrtenjak, Klobucar and Mali – Veliki Obrucan. In the rest of the Park navigation is

allowed. Visitors can spend the night onboard but can only moor and anchor at 18 designated places. Swimming is allowed up to 50 m from the coast line. Scuba diving requires a permit from an authorized diving company (and fee) and is allowed at nine sites with maximum one group (max. 15 persons) at each site. Individual diving, night diving and spearfishing are illegal. Recreational fishing is forbidden in the Park, only artisanal fishing by the residents or landowners is allowed. Appr. 100 persons have a license to fish, but they are also subject to regulations on the type of fishing gear and maximum catch.

### **Importance**

The Kornati Archipelago consists of 89 island and has a total coastline of 238 km. Its geomorphology is dominated by karst features. The abundant marine life finds shelter in the many caves and cracks created during the last Ice age, when the whole area around the current Archipelago was above sea-level.

Kornati is best known for its steep cliffs (the so-called "crowns") that at some places go vertically downhill over 90 meters deep into the sea.

It is estimated that at least 2,500 to 3,000 families of benthic and pelagic fauna live in the Kornati archipelago such as 22 species of corals, 177 species of mollusks, 127 species of polychaeta, 55 species of crustaceans, 64 species of echinodermata and 160 species of fish. Meadows of *Posidonia* are also present in the Park, up to depths of 30 meters.

### **Threats**

The biggest threats are tourism, illegal fishing, marine pollution, invasive species and illegal building.

About 100,000 people visit the Kornati

islands each year, a number that has been the same for the last 10 years. Especially in summer it can be really busy because the majority of visitors is coming with private / rented vessels (13,000 boats entered the Park in 2010). Hiking is allowed on some trails, but they are not used intensively. Anchoring is allowed in designated zones, but there are plans to install ecological buoys.

The fish stocks of the Adriatic Sea are in a very bad state and in the Kornati National Park fish stocks are still decreasing, although less severe than in non-protected areas. Some illegal fishing, especially by local residents, has been reported. It is very difficult to estimate the extracted biomass, although fishermen have to report their catches. It has been reported that fishermen are especially active during bad weather, when there is no surveillance. The area around Purara, one of the islands that has been a no-take zone since the beginning, does not show the abundance that would be expected from a 30 year old no-take zone. Spearfishing is forbidden in the Park, but divers have reported to see spearfishers at several occasions.

Since the Dalmatian coast of Croatia is intensively used, there is plenty of litter that ends up in the sea and in the Kornati National Park. Beach clean-ups are regularly organised.

In the last century, people planted pines next to their house on many of the islands. Pines are no part of the normal eco-system of the Kornati islands and have caused disruptions in the hydrological cycle. They also brittle the soil, enhancing the level of erosion. This year some pilot programmes will start on some smaller islands, in which pines will be cut to restore the natural balance. The marine invasive species *Caulerpa taxifolia* has also been observed in the last years, and is spreading in the entire Park.

A minor threat is illegal building, which has no real impact on biodiversity but is changing the landscape beauty for which the Kornati islands were declared a National Park.

### Management gaps

The biggest management gaps are related to lack of sufficient resources and equipment, bureaucratic issues with the Ministry and the 'Rules on Order inside the Kornati National Park'.

Financial resources are currently hindering proper research, monitoring and enforcement activities. The Park has two boats, but this is not enough to cover the entire Archipelago, which consists of 89 islands.

Although there is good communication with the Ministry (e.g. the Ministry often consults the Park), a permit is required for almost everything. A plan to install ecological buoys was proposed by the Park, but it takes a lot of time for the Ministry to approve this plan. After elections, there are always some things that change. After the recent elections, the Park now falls under the authority of a different Ministry, new regulations have been made and a new nature protection act is being developed.

It is difficult to effectively combat spearfishing since the punishment is not severe. When caught, spearfishers have to pay a fine of 500 HRK (65 euros) but can keep all their equipment. The Rules on Order do not allow the rangers to confiscate, this is a task of the police. Spearfishers take abuse of this problem and sometimes provoke the rangers.



### Nacionalni Park Kornati



**Above:** The Logo of the Kornati National Park, representing one of the famous Croatian sunsets.

**Below:** A crab in the Kornati National Park (© Kornati National Park).

### Exchange of information

There are good contacts with the other Croatian National Parks, Nature reserves and MPA's, which meet each other annually. Kornati National Park is member of EUROPARC through the Ministry, which transfers information and contact details. Kornati National Park is also founding member of MedPAN and its conservation manager is member of the board of directors (Kornati National Park has been the driving force to include all Croatian MPA's in the MedPAN network). Croatian MPA's have asked the Park for advice about scuba diving and fishing regulations. In 2011, the Kornati National Park

organised a conference with representatives from Montenegro and Albania, where new MPA's have just been created and more are in the pipeline.

The Kornati National Park is planning to build a new information center and is currently looking for advice and good ideas from other National Parks / MPA's through its networks.



**Above:** Aerial picture of the island of Smokvenjak (© 2010 Google Earth) from an eyeheight of 750 m.

**Below:** View on the Kornati National Park from Murter (© Robbert Casier).

### Success stories

The biggest success story is that the Kornati islands are still in the same condition as 30 years ago, when the Park was created. Although the terrestrial part is

in private ownership (which requires a comprehensive agreement with all 620 owners), no major tourist facilities were developed. It is especially the terrestrial part that is in good state, the marine part has changed due to decreasing fish stocks (although not as bad as outside the Park).

There is a good collaboration with the residents of the Archipelago and the Park. The Kornati National Park is very big with many hidden spots, so the collaboration of the residents is indispensable to know what is going on. There has also been a recent conflict with the Ministry, that wants to halt all fishing in the Park. Local residents and the Park are working together to try to prevent this.

### Volunteers

No volunteers are helping in the Park because there is no accommodation available and because it's complicated to arrange insurance.

### My work

I visited the offices of the Kornati National Park in Murter on Tuesday the 21<sup>st</sup> and Wednesday the 22<sup>nd</sup> of February. On Tuesday I spoke with Mr. Zlatko Ruzanovic, biologist, who told me about the main characteristics and some of the threats of the Park. On Wednesday I met Mr. Vladislav Mihelcic, Conservation Manager, who answered all my other questions. A trip to Kornati, 15 km away from Murter was not possible, but I explored the region around Murter, from where the Kornati National Park can be seen from a distance.

### Sources

Interview with Mr. Zlatko Ruzanovic and Mr. Vladislav Mihelcic

<http://www.kornati.hr/eng/index.asp>

Nacionalni park Kornati. 2011. Izletnička karta – Traveler's map – Carta turistica – Wanderkarte

Nacionalni park Kornati. 2005. Kornati, vue de la poupe. 159 p.

## Nacionalni park Brijuni

### Introduction

The Brijuni archipelago was declared a National Park in 1983 and covers a total surface of 3,395 ha (from which about 80% is marine). The Park has been receiving tourists since the end of the 19<sup>th</sup> century and was also the presidential residence of Tito from 1945 until 1980. In 1991 a Conference Center, four hotels and a safari park, exhibiting exotic animals given to Tito, were opened. It is the Park's intention that in the future the safari park will accommodate only local species such as goats, sheep, donkeys and istrian oxes. When Croatia joins the European Union, the Park will be proposed as a Natura 2000 site as part of a larger region that covers big parts of the Istrian coast.

### Management

The Brijuni National Park is property of the Ministry of Environmental and Nature Protection and managed by the Brijuni National Park Authority. Less than five percent of the Park is controlled by the military.

Appr. 250 people work fulltime in the Park, and are assisted in summer by about 40 seasonal employees. From those 250, most work in tourism and catering (107), maintenance and preservation (47), maintenance and transport (40) and financial accounting (14). About thirty persons work in surveillance and protection and three people on the conservation and preservation of natural heritage.

Quite unique about Brijuni National Park is

that all facilities on the islands (except the military properties) are owned by the Park: hotels, ferry, buildings, ... There are some plans to give part of the infrastructure in concession to private investors. Two boats are used for surveillance and one boat for monitoring missions. In 2011, the permanent surveilling wrote 73 fines, 12 motions to indict, 18 criminal charges for illegal fishing and 63 criminal charges for mooring and scuba diving (exceptionally high in 2011 due to a visitor peak).

A former boat house is being renovated to accommodate the first information and educational center. Information is available at the Park's website, although it is mainly used as a tool for potential visitors: <http://www.brijuni.hr/en/>.

The total budget in 2010 was 54 million Croatian kunas (or appr. 7 million euros), from which 90% came from own revenues (entrance tickets) and 10% from government sources. No big budget cuts have occurred for the 2011 and 2012 financial years.

In the frame of the MedPAN South project 'Strengthening the network of marine protected areas in Croatia', a management plan is currently being developed and it is expected to be finalized in 2012.

Recreational fishing and angling are allowed at three locations: (1) around the islands of Kotez and Sv. Jerolim; (2) from shore on two locations on Veli Brijun; and (3) outside of the main harbour on Veli Brijun. Recreational fishing is allowed only with valid permits. There are three no-take zones where only monitoring, scientific research and navigation from the Park services, military, police and fishing inspection is allowed. The biggest part of the Park is a general zone, where navigation is possible but regulated. Anchoring is only allowed at one spot in the MPA, at the main harbour, for ships that can not sail into the harbour. Scuba-diving

is only possible at three locations, under the supervision of professional guides or the concessionaire.

### Importance

As a large national park, the Brijuni Archipelago is a IUCN category II area that consists of 14 islands, from which the biggest island, Veliki Brijun, accounts for 75% of the terrestrial surface.



**Above:** One of the surveillance boats from the Park (© Robbert Casier).

**Below:** View on the bay of Javorika (Uvala Javorika) (© Robbert Casier).

There is a wide variety of littoral biocoenoses, and the waters of Brijuni are important hatching grounds for many fish such as sea basses (*Dicentrarchus labrax*), giltheades (*Sparus aurata*), brown meagres (*Sciaena umbra*), grey mullets (Mugilidae),

soles (Soleidae), groupers (*Epinephelinae*), conger eels (*Conger conger*) and common dentexes (*Dentex dentex*). Procted species as the pen shell (*Pinna nobilis*), date shell (*Lithophaga lithophaga*), loggerhead turtles (*Caretta caretta*), dolphins (*Tursiops truncatus*) and posidonia meadows can be observed. Two of the most iconic endemic species are the brown algae (*Fucus virsoides*) and the tunicate (*Polycitor adriaticus*).

The Brijuni National Park exhibits about 250 dinosaur-footsteps with an age between 125 and 100 million year.

The Brijuni National Park is also an important seasonal habitat for migratory birds. The Bay of Saline is a 7 ha swamp that is closed to the public and serves as a protected ornithological reserve. Almost 150 bird species have been recorded in the Park. The red-throated loon (*Gavia stellata*), Mediterranean shag (*Phalacrocorax aristotelis desmarestii*) – protected under the EU's Bird Directive and the Bern Convention - and sterns (*Sterna sandvicensis*) are some of the most important visitors.

### Threats

There is only one major threat: illegal fishing. Local fishermen from Pula, Fazana and Peroj sometimes try to fish at night inside the Park. Each year, about 20 criminal charges for illegal fishing are issued by the permanent surveillance team on the island.

### Management gaps

There are some minor management gaps that deal with bureaucracy, offices at different locations and the importance of tourism.

The director is appointed by the Ministry and thus has a political position. There are no complaints about the current director,

but it can make a great difference if the director is an economist or scientist. A permission from the Ministry is required for almost everything. E.g. the Park recently had to ask for a permission to install three camera's in birdnests. Although requests for permissions are mostly granted and give the Ministry the opportunity to know what is happening in the Park, it can sometimes slow down the working speed.

There are sometimes organizational problems caused by the fact that the main offices are based on land in Fazana, while the other offices are based on Veli Brijun.



**Above:** View at the bay of Verige, with a roman villa that is half submerged (© Robbert Casier).

**Below:** Impression of the calcareous cliffs in the Park (© Robbert Casier).

In the past, there have been some concerns that tourism had a higher priority than nature conservation. The minister of Tourism once stated that Brijuni should be at the top of the pyramid of Istrian and Croatian tourism. However, a lot has changed in the last two years and nature protection has received much more attention. There have also been several new scientific projects such as underwater mapping, coastal habitat mapping, monitoring of the mediterranean shag, ... .

### Exchange of information

Each year there normally is a meeting between all conservation managers of the Croatia National Parks, where information is exchanged. The directors / biologists are in good contact with each other so it is easy to ask for advice. During the last year, workshops were organised by the NGO Sunce and WWF to provide the Croatian National Parks technical support in creating financially feasible management plans (in the frame of the MedPAN South project). During those workshops there was also exchange of information between the parks.

The Brijuni National Park is member of MedPAN and is supporting the development of the AdriaPAN network, through which information can be exchanged with other Mediterranean and especially Italian MPA's. There have been contacts with french MPA's about the underwater trails, and the Park is currently looking for advice about their information center that is soon to be finished.

Brijuni National Park is member of EUROPARC through the Ministry, which transfers information and contact details.

### Success stories

The Brijuni National Park has been a tourist

destination since the end of the 19<sup>th</sup> century. About 150,000 visitors come to the Brijuni National Park each year. Although 85% of the terrestrial area is open for the public, visitors are no real threat because they are well managed. Most visitors are part of a program, in which they visit the Park in groups and are always monitored. When a boat arrives (with approx. 200 people), the people are divided into groups and guided on a small train through the Park. Part of the tour is through the 'Safari Park'. Several special tours for which reservations are required, have been developed, such as a dinosaur tour, an educational tour, guided snorkeling tours, an archeological tour, birdwatching tours, ... It is believed these tours have a big potential.

Only people that sleep on the island have in theory free access to the entire island, but those people only account for 1% of all visitors.

The reserve effect is clearly witnessed in the Brijuni National Park. No fishing was allowed since its establishment, and before that the Brijuni Islands were a military domain for almost 30 years where no fishing was allowed. This means that the archipelago has been free of fishing, at least in theory, for almost 60 years. The Brijuni National Park is also the only Croatian MPA where the reserve effect has been scientifically demonstrated (through a visual census)<sup>12</sup>. A clear example of this is the presence of *Pinna nobilis* that are even very numerous in the harbour (e.g. one can easily count several specimens during a 5 minute stroll on the harbour docks).

## Volunteers

Each year, one or two volunteers come to

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12 Stagicic N., Pallaoro A. Institute of Oceanography and Fisheries Split. 2009. Preliminary report on the estimated effect of MP's in the Eastern Adriatic.

work on a specific project (e.g. habitat mapping using GIS) in the Park, through the European *Eurodyssey* program. A few times per year a beach clean-up is organised, and 20-50 local volunteers (including e.g. divers) help with these activities.

## My work

I visited the Brijuni National Park on Friday the 24<sup>th</sup> of February. Mrs. Moira Bursic, biologist, showed me the most important features of the main island Veli Brijuni: two of the three no-take zones (among which the Uvala Javorika or Saline Bay), the dinosaur footsteps at Uvala Vrbanj, Uvala Jezero and Uvala Verige, an important archeological site. Mrs. Bursic also showed me the Safari Park, the Byzantine Castrum and the two surveillance boats. She gave me a lot of information and answered on all my questions.

## Sources

Interview with Mrs. Moira Bursic

<http://www.brijuni.hr/en/>.

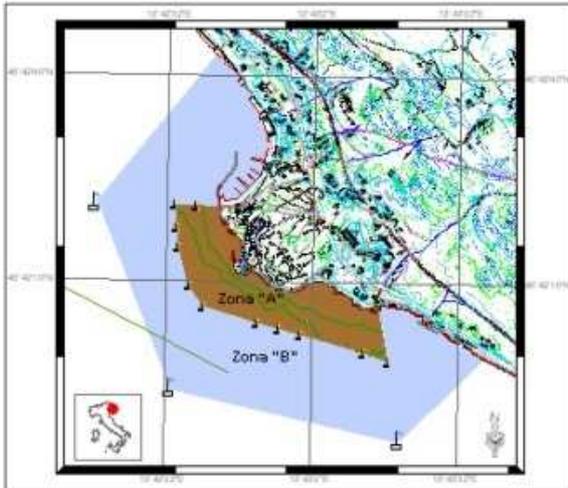
Javna Ustanova Nacionalni park Brijuni. Flora, Fauna, submarine world, cultural-historical heritage.

## Riserva Naturale Marina di Miramare

### Introduction

The Natural Marine Reserve of Miramare (120 ha) was designated in 1986 and is the oldest protected area in Italy (together with Ustica). An effective management structure was established in 1989, the only MPA management structure in Italy that is controlled by a private institution, and not by the coastal municipalities. In 1994, the MPA was extended with a buffer zone, in response to the increasing activities from 'lampara' (using lights to attract fish)

fishermen. The MPA is part of an UNESCO-MAB Biosphere Reserve, the WWF-Italy Oases and Protected Areas network, a SPAMI-zone and since June 2011 it is also a Site of Community Interest. About 30,000 people visit the visitor center each year, and about 1,500 people come to dive in the MPA Miramare.



**Above:** Zonation of the MPA Miramare with the core zone (zone A – 30 ha) and the buffer zone (zone B – 90 ha). Adapted from <http://www.riservamarinamiramare.it>.

**Below:** Logo of the MPA Miramare with the *Blennius pavo*, a small and coloured fish that lives in the tidal zone.

## Management

The marine protected area of Miramare is in State Concession and directly controlled by the Italian Ministry of the Environment and Protection of the Land and the Sea. It has given the right to manage the area to the Italian association WWF, which in turn has an agreement with the private cooperation Shoreline. Approximately 15 persons work in the MPA, and extra employees are hired in summer. Enforcement is done by the police.

The budget used to be appr. 300,000 euros, but in 2012 this will probably be more in the order of 240,000 euros. Over the last two years there has been a budget reduction of 40%. Sixty percent of the annual budget is coming from the government while 40% is derived from own revenues, such as entrance tickets for the visitor centre, permits to scuba-dive and selling of publications, books and t-shirts.

The marine reserve has four boats and diving equipment at its disposal. The Castelletto, an old royal villa that belongs to the patrimonium owned by the Italian State, accomodates a visitor centre, library, scientific laboratory and the offices. The Miramare Marine Environmental Education Centre (CEAM) is the educational branch of the MPA. There is some accomodation for divers in place just next to the water, and this area can also be used for educational activities. Plenty of information is available at the website: <http://www.riservamarinamiramare.it/>.

An adaptive management plan is available and updated every three year.

The marine protected area is divided in a core-zone (30ha) and a buffer zone (90ha). The core zone is actually a no-take zone, where only scientific research and activities from the MPA are allowed. In the buffer zone it is allowed to navigate with private

vessels and to angle from shore. The buffer zone is actually managed by the Trieste Harbour Office Ordinance. Professional and recreational fishing are forbidden in the entire MPA.

### Importance

The promontory of Miramare, around which the reserve is localised, is the place where the lithology changes from calcareous rocks (going south to Istria and the entire Croatian coast) to sandy and muddy seabeds (like the entire Italian coast in the Northern Adriatic Sea). There are several forces that affect the MPA, like the strong Northwestern winds (*Bora*), the inflow from fresh water from rain and watersheds and the tidal forces. For all these reasons, the MPA Miramare, with water depths up to 18 m, is one of the biological hotspots of the Northern Adriatic Sea. Besides eurihaline and eurithermal benthic communities, Miramare also has a high abundance of labrids (*Labroidea*), blennies (*Blennioidei*), sparids (*Sparidae*) and gobiids (*Gobiidae*). Research has identified Miramare as one of the parks with the highest rate of fish abundance among all the Italian marine parks<sup>13</sup>. Its most iconic species are the striped bream (*Lithognathus mormyrus*), brown meagre (*Sciaena umbra*) and *Blennius pavo*, a tidals fish which is also used in the logo.



**Above:** The Castle of Miramare (© Robert Casier).

**Below:** Aerial picture of the Natural Marine Reserve Miramare (© Google Earth, 2008, eyeheight: 1,7 km)

In the tidal zone one can find the endemic algae *Fucus virsoides* and the associated mediolittoral rock biocenosis. Seagrass beds (*Zostera marina*, *Cymodocea nodosa* and *Posidonia oceanica*) can also be observed.

Dolphins (*Tursiops truncatus*) are occasionally present in the MPA and a breaching fin whale (*Balaenoptera physalus*) was observed in the MPA three years ago.

### Threats

There are only some minor threats related to the proximity of the harbour of Trieste and illegal fishing.

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<sup>13</sup> Italian Ministry of Environment, Land and Sea, WWF Italy ONG. Miramare marine protected area (MPA), Cartoguida MAP Guide.

Trieste is one of the biggest port in Italy and over 40 million tonnes of cargo is handled in Trieste each year<sup>14</sup>. The marine reserve is only located 5 km from this harbour and is thus subject to all kind of potential risks. Each year an oil spill contingency plan is rehursed but no major oil spill has occurred in the last 25 years. Heavy metals are present in all the sediments in Trieste's vicinity, but no real impact on marine life has been observed. The impact of noise on marine life is relatively unknown, although research on this issue is currently performed.

Two or three times a year, there are some problems with fishing vessels illegally entering the MPA, but the police is always responding fast and adequate.

### **Management gaps**

Most important management gaps are the lack of an independent legal status and the decreased budget for this year.

The most important management problem is that the MPA itself has no legal status. All major decisions, permissions, signatures go through WWF or the Ministry. Financial funds also have to pass several institutions and this slows down the working speed of the marine protected area.

During the last two years, the budget has decrease with 40%, mainly because less money came from the government. This resulted in less using the boats, less monitoring, less diving and less general expenses but the reserve also counts on an increase in revenues from touristic activities.

Other minor managment gaps are of a

bureaucratic nature e.g. that the law prescribes that 11 buoys should delineate the core zone, although not all of them are necessary (expensive to clean), or the fact that two different Italian Ministrys are involved (the one that owns the buildings where e.g. the offices are located and another one that owns the MPA).

### **Success stories**

There is a good collaboration with fishermen, which have worked together with the marine reserve in many projects. In 1994 the core zone was extended with a buffer zone, in response to the increasing activities of lampara fishermen (using lights at night to catch fish. After the establishment of the buffer zone, there was a lot of aversion towards this zone from the fishermen, who kept on fishing in the buffer zone. During a two-year program the MPA tried to explain the fishermen that their targetted fish were entering the MPA from outside, and not the other way around. With this program, in which two biologists often went on board the fishing vessels and recorded data about the catches, the fishermen learnt that is was better for them to fish outside the buffer zone. This was also in the benefit of the MPA since the targetted fish by the fishermen were different from the fish that benefitted most from the reserve.

Attempts were made to introduce 'fishing-tourism', in which tourist / visitors go on the boat and learn about the fishing process. Fishermen agreed to participate at first, but this program was unsuccessful because the tourism activity could not be considered as an alternative way of income. It was also time-consuming to organise (most boats go out during the night) and to arrange insurance.

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[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Maritime\\_ports\\_freight\\_and\\_passenger\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Maritime_ports_freight_and_passenger_statistics)



**Above:** One of the 11 buoys that delineates the core zone (© Robert Casier).

**Below:** Example of an educational activity in the Visitor Centre (© MPA Miramare).

An educational activity is organised almost every weekend. These activities include: sea watching tours, guided scuba diving tours with short marine biology introduction, a blue weekend, talks about a specific species – based on seasonal availability or weather, ...

From the 30,000 visitors of the Visitor Centre, appr. 10,000 are students younger than 18 years.

The MPA also organises general 'awareness campaigns' about the marine environment, e.g. about which fish best to eat or about marine pollution. Several reference-publications about the marine life in the Gulf of Trieste have also been made.

Although Miramare is one of the smallest MPA's in the Mediterranean and surrounded by many human activities (popular beaches, harbour of Trieste, mussel aquaculture), thirty years without fishing has resulted in a 'reserve effect'. Especially the number of brown meagres (*Corvina nigra*) are remarkably higher in the MPA than outside. There are also more small fish inside the MPA, which suggests that Miramare serves as a reproduction zone. In general, Miramare has achieved many things with a modest budget and number of staff, at least compared to the budgets from many other, younger MPA's.

Before the creation of the MPA, in 1978, an artificial reef (30 m long, 6 m wide and 3 m high) with reinforced concrete tubes was placed in the current MPA. Its original function was to impede fishing activities but over the years the reef has become a shelter for epibenthic organisms and fishes.

### Exchange of information

As the oldest MPA in Italy, Miramare has a lot of information / experience that could be interesting for other MPA's in the Mediterranean and Adriatic Sea. Miramare is well known and they often receive questions about project propositions (Miramare has been quite successful in writing project propositions) or educational activities.

The Miramare MPA is member of MedPAN (founding member) and CIESM (The Mediterranean Science Commission) but not of EUROPARC. They are also involved in the creation of the AdriaPAN Network, which increase collaboration between Italian, Slovenian, Croatian, Montenegrins and Albanian MPA's in the Adriatic Sea. Miramare has also been collaborating with many initiatives, e.g. with the CIESM coast-to-coast peace parks in which the South Adriatic Sea is one of the targetted areas.

## Volunteers

Once or twice a year the MPA is assisted by volunteers that can help with all kind of activities. In general there is a lack of those volunteers, most are only qualified to help with one specific task.

## My work

I visited the Natural Marine Reserve of Miramare on Saturday the 25<sup>th</sup> of February. Mr. Roberto Odorico, biologist and vice-president, guided me in the MPA. We first took a tour on one of the boats to have a good impression of the reserve. Mr. Odorico showed me the core zone, buffer zone, buoys, the castle of Miramare and the accomodation close to the sea that is available for divers and educational activities. We also saw some divers performing a monitoring tour. Mr. Odorico showed me the Visitor Centre, where visitors and students can learn about the marine environment. Children have to remove their shoes at the start and have to walk bare-foot on the floor that is covered with sand and shells. Mr. Odorico answered on all my questions and I received an information package with books about the Gulf of Trieste and other promotional materials.

## Sources

Interview with Mr. Roberto Odorico

<http://www.riservamarinamiramare.it/>

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[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Maritime\\_ports\\_freight\\_and\\_passenger\\_statistics](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Maritime_ports_freight_and_passenger_statistics)

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UNEP-MAP-RAC/SPA, 2009. The SPAMIs of the Mediterranean Sea. RAC/SPA edit, Tunis, 48 p.

## ANNEX I: Project Proposal

The original project proposal with which I applied for the Alfred Toepfer Natural Heritage Scholarship was situated in the theme of "International / Transboundary communication", and can be found below.

The project's objectives are to: (1) Determine the most important threats and management gaps of all visited sites; (2) Investigate the common problems and challenges of the studied sites; (3) Demonstrate that more transboundary communication between MPAs and World Heritage marine sites can be beneficial for both parties; and (4) Check whether World Heritage marine sites can be considered as 'examples of management excellence' for MPAs.

During my study visits, I will search for common threats, common management gaps and specific case-studies that could be interesting for other studied areas. MPAs can learn from the constant monitoring process to which World Heritage sites are subject, and World Heritage marine sites can learn from specific solutions for specific problems found by MPAs.

My project has three important parts:

1) An initial literature study to get acquainted with the core values of the studied sites and to make an overview of the contacts made with other MPAs in the past. If some contacts have already been made, I will search on what specific domains the contacts were made (common threats, questions about specific management actions, between MPAs inside / outside the country, ... ). If no contacts have been made, I will search for subjects where communication and exchange of information could be beneficial for both parties, although this should probably primarily be done at the site itself.

2) The site visits will first give me a general impression of the core values of the sites, necessary to understand the impact of specific threats and management needs. Second, I will talk with the management team, or at least the people that work directly on threats and management issues, about the major threats

and management actions. To give already some examples of possible questions: I will ask them about the most important problems for their site; about what they need the most, if they have encountered specific problems and if how they have solved those problems.

3) In my final paper, I will describe the visited sites: their core values, main threats and success stories. I will give an overview of contacts and exchange of information with other MPAs, and also of areas where exchange of information could be beneficial.

With this project, I hope to: (1) Further increase my practical and theoretical knowledge about World Heritage marine sites, MPAs and issues related to threats and management; and (2) Increase communication and exchange of knowledge between MPAs and World Heritage marine sites in the Mediterranean Sea.

The selected sites are: (1) The World Heritage marine site Parc Natural de Ses Salines (Ibiza, Spain); (2) The MPA of Brijuni (Croatia); (3) Cres-Losinj dolphin reserve (Croatia) and (4) Lastovsko otočje (Croatia); Contacts with the Parc Marin de Bonifaccio are ongoing.

These sites present a perfect mix between World Heritage marine sites, MPAs, Natura 2000 sites, potential nominated Natura 2000 sites, sites with extensive experience and sites where protection measures have only recently been introduced. Bearing in mind the objectives of this project, a well-balanced and diverse mix of different kind of marine areas is essential.

**ANNEX II: Summary table with names, email addresses, success stories and topics where information could be interesting**

NAME OF MPA	CONTACT PERSON	SUCCESS STORIES	ADVICE WELCOME ABOUT / INTERESTED IN
<b>Southern Waters of Gibraltar</b> <a href="http://www.gibraltar.gov.gi/environment/environment#publications">http://www.gibraltar.gov.gi/environment/environment#publications</a>	Stephen Warr, Environmental officer <a href="mailto:stephen.warr@gibraltar.gov.gi">stephen.warr@gibraltar.gov.gi</a>	<ul style="list-style-type: none"> <li>Prohibition of catch of Spider crabs</li> <li>Artificial reefs since 1970s</li> <li>The ribbed Mediterranean limpet needs to be relocated when affected by development works</li> </ul>	<ul style="list-style-type: none"> <li>Balance between commercial activities and nature conservation objectives</li> <li>Creation of diving-hub</li> </ul>
<b>Isla de Tabarca</b> <a href="http://www.reservasmarinas.net">www.reservasmarinas.net</a>	Felio Lozano, Scientific coordinator <a href="mailto:flozano@tragsa.es">flozano@tragsa.es</a> Silvia Revenga, ministry <a href="mailto:srevenga@marm.es">srevenga@marm.es</a>	<ul style="list-style-type: none"> <li>Reserve effect</li> <li>Artisanal fishing is still allowed in the marine reserve</li> <li>Permanent surveillance has its effect, less offenses each year</li> </ul>	<ul style="list-style-type: none"> <li>In general, what kind of scientific monitoring programs?</li> </ul>
<b>Levante de Mallorca - Cala Ratjada</b> <a href="http://www.reservasmarinas.net">www.reservasmarinas.net</a>	Javier Lloren, Scientific coordinator <a href="mailto:jlloren1@tragsa.es">jlloren1@tragsa.es</a> Silvia Revenga, ministry <a href="mailto:srevenga@marm.es">srevenga@marm.es</a>	<ul style="list-style-type: none"> <li>Change in attitude towards MPA</li> <li>Reserve effect</li> </ul>	<ul style="list-style-type: none"> <li>How is constant surveillance practically arranged (time-tables, ...)</li> <li>What indicators are used for monitoring?</li> </ul>
<b>Parque Nacional del Archipiélago de Cabrera</b> <a href="http://reddeparquesnacionales.mma.es/parques/cabrera">http://reddeparquesnacionales.mma.es/parques/cabrera</a>	Jose Amengual, Scientific coordinator <a href="mailto:jfamengual@espaisnb.caib.es">jfamengual@espaisnb.caib.es</a>	<ul style="list-style-type: none"> <li>Plenty of scientific research about marine invasive species</li> <li>Successful fisheries management</li> <li>Regulation of visitors</li> </ul>	<ul style="list-style-type: none"> <li>How is fisheries management regulated?</li> <li>Ongoing research about crustaceans?</li> <li>How is dealt with marine invasive species?</li> </ul>
<b>Réserve Naturelle Marine de Cerbère-Banyuls</b> <a href="http://www.cg66.fr/62-la-reserve-marine-de-cerbere-banyuls.htm">http://www.cg66.fr/62-la-reserve-marine-de-cerbere-banyuls.htm</a>	Jean-Francois Planque, Pedagogic coordinator <a href="mailto:jean-francois.planque@cg66.fr">jean-francois.planque@cg66.fr</a>	<ul style="list-style-type: none"> <li>Underwater trail since 2001</li> <li>Intense pedagogic programme</li> <li>Reserve effect</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of species (other species then groupers)</li> </ul>
<b>Marine Natura 2000 site Posidonies du Cap d'Agde</b> <a href="http://www.adena-bagnas.com/">http://www.adena-bagnas.com/</a>	Renaud Dupuy de la Grandrive, director <a href="mailto:adena.bagnas@free.fr">adena.bagnas@free.fr</a>	<ul style="list-style-type: none"> <li>Change in attitude towards MPA</li> <li>Underwater trail since 1995</li> <li>Intense dialogue with stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Sensibilisation / awareness campaigns</li> <li>How to give a financial value to the natural</li> </ul>

				values in the MPA?
<p><b>Parc national de Port-Cros</b>  <a href="http://www.portcrosparcnational.fr">www.portcrosparcnational.fr</a>  <a href="http://www.facebook.com/pages/Parc-national-de-Port-Cros-et-Porquerolles-page-officielle/248466951874663">http://www.facebook.com/pages/Parc-national-de-Port-Cros-et-Porquerolles-page-officielle/248466951874663</a></p>	<p>Johann Cerisier, ranger  <a href="mailto:johann.cerisier@portcrosparcnational.fr">johann.cerisier@portcrosparcnational.fr</a>            Communication:  <a href="mailto:christine.graillet@portcrosparcnational.fr">christine.graillet@portcrosparcnational.fr</a></p>	<ul style="list-style-type: none"> <li>• In the pipeline: catamaran to be used for eco-tourism and research</li> <li>• Reserve effect</li> <li>• Underwater trail since 1979</li> <li>• General public support</li> <li>• Plenty of footage since the 1970s</li> </ul>	<ul style="list-style-type: none"> <li>• In general, what kind of scientific monitoring programs?</li> </ul>	
<p><b>MedPAN Secretary</b>  <a href="http://www.medpan.org">www.medpan.org</a></p>	<p>Marie Romani  <a href="mailto:Marie.romani@medpan.org">Marie.romani@medpan.org</a></p>			
<p><b>Area Marina Protetta Isola di Bergeggi</b>  <a href="http://www.ampisolabergeggi.it/">www.ampisolabergeggi.it/</a></p>	<p>Simone Bava, director  <a href="mailto:direttore@ampisolabergeggi.it">direttore@ampisolabergeggi.it</a></p>	<ul style="list-style-type: none"> <li>• Change in attitude towards MPA</li> <li>• Plenty of scientific information available</li> <li>• Reserve effect</li> </ul>	<ul style="list-style-type: none"> <li>• Specific management problems</li> <li>• How is recreational fishing regulated?</li> <li>• How is being dealt with bureaucracy?</li> </ul>	
<p><b>Area Marina Protetta Portofino</b>  <a href="http://www.portofinoamp.it">www.portofinoamp.it</a></p>	<p>Valentina Cappanera, biologist  <a href="mailto:v.cappanera@portofinoamp.it">v.cappanera@portofinoamp.it</a></p>	<ul style="list-style-type: none"> <li>• Reserve effect</li> <li>• Ecological mooring zones</li> </ul>	<ul style="list-style-type: none"> <li>• How is recreational fishing regulated?</li> <li>• Projects to reform dive-permits and use dive-centres</li> </ul>	
<p><b>Parco Nazionale Arcipelago Toscano</b>  <a href="http://www.islepark.it/">http://www.islepark.it/</a></p>	<p>Franca Zanichelli, director  <a href="mailto:direzione@islepark.it">direzione@islepark.it</a></p>	<ul style="list-style-type: none"> <li>• Rat-eradication programme</li> </ul>	<ul style="list-style-type: none"> <li>• How to constantly diversify employees and attract new experience ?</li> </ul>	
<p><b>Area Marina Protetta Isola de Ventotene e Santo Stefano</b>  <a href="http://www.riservaventotene.it">http://www.riservaventotene.it</a></p>	<p>Antonio Romano, Scientific coordinator  <a href="mailto:info@riservaventotene.it">info@riservaventotene.it</a></p>	<ul style="list-style-type: none"> <li>• Plenty of scientific data about extracted biomass</li> <li>• Programmes with divers and recreational fishermen</li> </ul>	<ul style="list-style-type: none"> <li>• In general, how are MPA's managed?</li> <li>• In general, what kind of scientific monitoring programs?</li> </ul>	
<p><b>Area Marina Protetta Torre del Cerrano</b>  <a href="http://www.torredelcerrano.it/">http://www.torredelcerrano.it/</a></p>	<p>Fabio Vallarola, director  <a href="mailto:info@torredelcerrano.it">info@torredelcerrano.it</a></p>	<ul style="list-style-type: none"> <li>• Change in attitude towards MPA</li> <li>• Private association makes it easier to organise activities, buy things</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative ways of financing</li> <li>• Project proposition</li> </ul>	

			<ul style="list-style-type: none"> <li>• AdriaPAN, network of MPA's in the Adriatic Sea</li> <li>• Program to increase number of kentish plovers (<i>Charadrius alexandrinus</i>)</li> <li>• Islands have not changed in 30 years</li> <li>• Good collaboration between residents and Park</li> <li>• Visitor management</li> <li>• Reserve effect</li> <li>• Good collaboration with fishermen</li> <li>• Educational activities (almost every week one)</li> <li>• Reserve effect</li> <li>• Artificial reefs, installed to impede fishing activities and increase biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Ideas for an information center</li> <li>• How to optimize surveillance</li> <li>• Ideas for an information and educational center</li> <li>• In general, what kind of scientific monitoring programs?</li> </ul>
<b>Nacionalni parc Kornati</b> <a href="http://www.kornati.hr/hrv/index.asp">http://www.kornati.hr/hrv/index.asp</a>	Vladislav Mihelcic, conservation manager <a href="mailto:vladislav.mihelcic@kornati.hr">vladislav.mihelcic@kornati.hr</a>			
<b>Nacionalni parc Brijuni</b> <a href="http://www.brijuni.hr/en/">http://www.brijuni.hr/en/</a>	Mrs. Moira Bursic, biologist <a href="mailto:m.bursic@brijuni.hr">m.bursic@brijuni.hr</a> <a href="http://www.brijuni.hr">www.brijuni.hr</a>			
<b>Area Marina Protetta Miramare</b> <a href="http://www.riservamarinamiramare.it/">http://www.riservamarinamiramare.it/</a> <a href="http://www.facebook.com/AMPMiramare">http://www.facebook.com/AMPMiramare</a>	Mr. Roberto Odorico, vice-president <a href="mailto:roberto.odorico@shoreline.it">roberto.odorico@shoreline.it</a>			