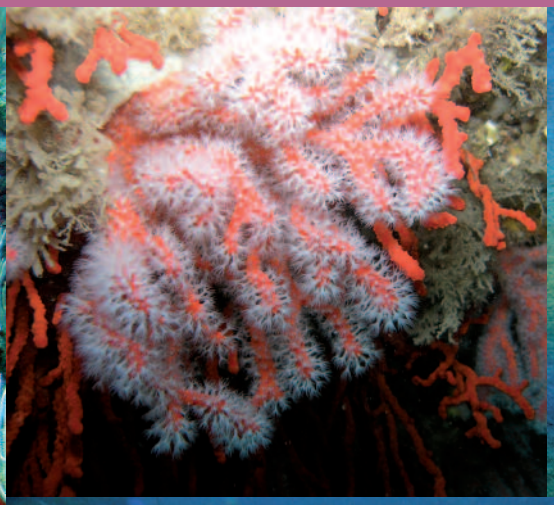
Réseau des gestionnaires d'aires marines protégées en Méditerranée
The Network of Managers of Marine Protected Areas in the Mediterranean

CONSEIL GENERAL PYRENEES-ORIENTALES

Réserve Naturelle CERBERE-BANYULS

Management tool



Assistance guide to the management of the Protected Marine Areas

Management and follow-up of the diving activity

February 2007

Nord Est SUD Ouest INTERREG IIIC

ASSISTANCE GUIDE TO THE MANAGEMENT OF THE PROTECTED MARINE AREAS

MANAGEMENT AND FOLLOW-UP OF THE DIVING ACTIVITY

Photographic appropriations:
Nicolas DALIAS, Jose Antonio GARCIA-CHARTON, Fabrice JAVEL, Jérémy PASTOR, Charline BARDELLETTI, Natural Marine Reserve of Cerbère-Banyuls

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This assistance guide for the management of Marine Protected Areas has been produced within the program Interreg IIIC Southern zone "MedPAN" for which the General Council of Pyrénées-Orientales, manager of the Natural Marine Reserve of Cerbère-Banyuls, is a technical and financial partner.

This guide was designed in order to help all the concerned managers to be able to set up a suitable management and a follow-up of the diving activity according to the specificities of the zone which they have to manage. It includes:

- a synthesis of the work completed in term of diving impact study,
- a protocol proposal to set up a follow-up of the frequentation and impact,
- a presentation of the awareness tools for a respectful diving and examples of installations for a subaquatic eco-tourism,
- a catalogue of existing measures of management on all the sites of the MedPAN network,
- a cd-rom that contains all examples of management tools communicated by MPA managers.

Even if the diving practice is similar, the context in which it is held remains specific to each Marine Protected Area. However, the management of this activity must combine an educational, technical and legal approach.

This guide is a non-exhaustive compilation of these types of approach and it must be used more as a guide of assistance to management.

Also to facilitate managers' work, and while using the Mediterranean Marine Protected Areas repertory, we compiled after each awareness measures and management, a list of areas having used these measures.

We invite the reader to directly contact the managers of these marine areas.

Several people took part in making of this management tool:

- Nicolas DALIAS, Franck HENNEQUART and Patrick BARRAQUE GARAT, OCEANIDE,
- Philippe LENFANT, Tropical and Mediterranean Watery Ecosystems Laboratory, FRE EPHE-CNRS 2935, University of Perpignan,
- Marie-Laure LICARI, the General Council of Pyrenees-Orientales, Natural Marine Reserve of Cerberes-Banyuls,
- Charline BARDELLETTI, student IUT Perpignan,
- Anne PEROY, the General Council of Pyrénées-Orientales, service CAM,
- Jose Antonio GARCIA-CHARTON, Grupo de Investigacion "Ecologia y Ordenacion de Ecosistemos Marinos Costeros" Departamento de Ecologia E Hidrologia, Universidad de Murcia (Spain).

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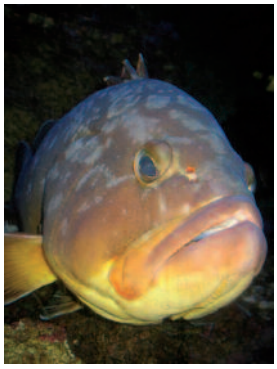
Marine Protected Areas and scuba diving

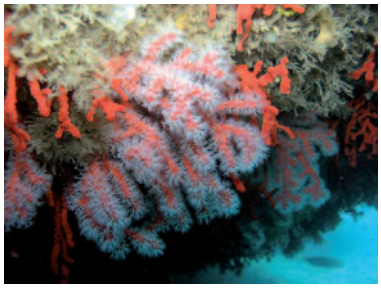
1 - Marine Protected Areas

The Mediterranea is characterized by a great specific diversity, with a high rate of endemism. **Among its emblematic species, a lot are threatened**, some are protected (Posidonie *Posidonia oceanica*, Brown grouper *Epinephelus marginatus*, Great mother-of-pearl *Pinna nobilis*) but others are not (red Coral *Corallium rubrum*).

The Mediterranean sea is ecologically vulnerable. **Since the last century, it has been prone to an increasing anthropic pressure** (demography, pollution, increased resources exploitation, tourism and maritime transport). These factors cause various degradations of the marine environment and have a direct negative effect on the species and their habitats, involving their regression and even sometimes their disappearance.

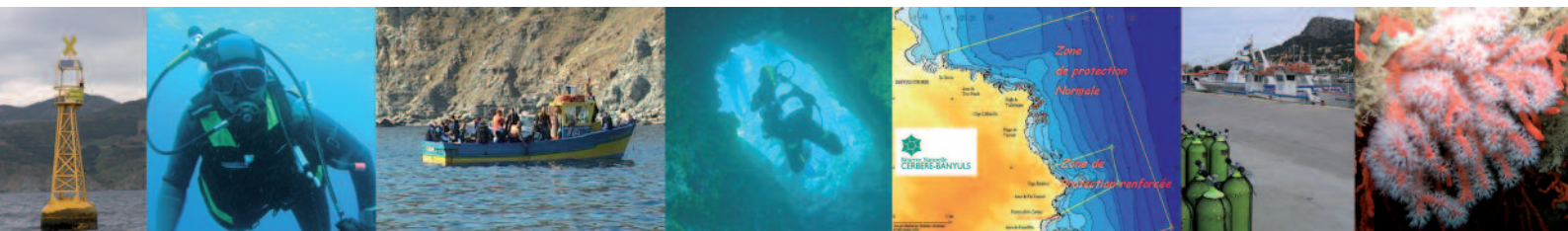


The protection of sites of great natural value is consequently of primary importance. The ecosystems representative of the Mediterranean sea which is generally important for the threatened species or in danger must be preserved.



The creation of Marine Protected Areas (MPA) is an effective tool to provide a durable protection. The MPA allow the restoration and the advised use of this natural heritage. **In the 21 countries which border the Mediterranean sea, there is today 75 MPA and about thirty projects of creation** (Figure 1). The scientists and the international organizations concerned consider that it would be necessary to protect 10% to 15% from the marine environment to ensure its conservation durably. This observation shows the interest and the good management of the current or future MPA.

Picture 1:
Mediterranean Marine Areas



Principal activities, considered as factors of the environement deterioration **to which the MPA must face are as follows** (Dalias, 2004):

- coastal installations (harbours, dams) (Augier and Boudouresque, 1970; Augier and Seiller, 1978; Picard, 1978; Boudouresque et *al.*, 1980; Meinesz and *al.*, 1981; Marcot-Coquegniot, 1983; Marcot-Coquegniot et *al.*, 1983; Astier, 1984; Augier, 1985; Bourcier, 1989),
- human occupation (rejections and contributions of the inhabited zones) (Peres, 1984; Augier et *al.*, 1984; Augier et *al.*, 1988; Bourcier, 1989; Pergent et *al.*, 1995; Pergent-Martini et *al.*, 1999),
- agriculture (Pergent and *al.*, 1985),
- sea traffic (goods, passengers) (Augier and Seiller, 1978; Picard, 1978; Moreteau, 1981; Marcot-Coquegniot, 1983; Marcot-Coquegniot et *al.*, 1983; Porcher, 1984; Porcher and Jeudy de Grissac, 1985; Bourcier, 1989),
- exploitation of the alive resources (fish, shellfish, etc.) (Ardizzone and Pelusi, 1983; Peres, 1984; Charbonnel et *al.*, 1999),
- tourism (swimming, diving, pleasure, walking, fishing, spear fishing, etc.) (Augier and Boudouresque, 1970; Moreteau, 1981; Robert, 1983; Porcher, 1984; Porcher and Jeudy de Grissac, 1985; Centene, 1992; Boudouresque et *al.*, 1995; Charbonnel, 1996).

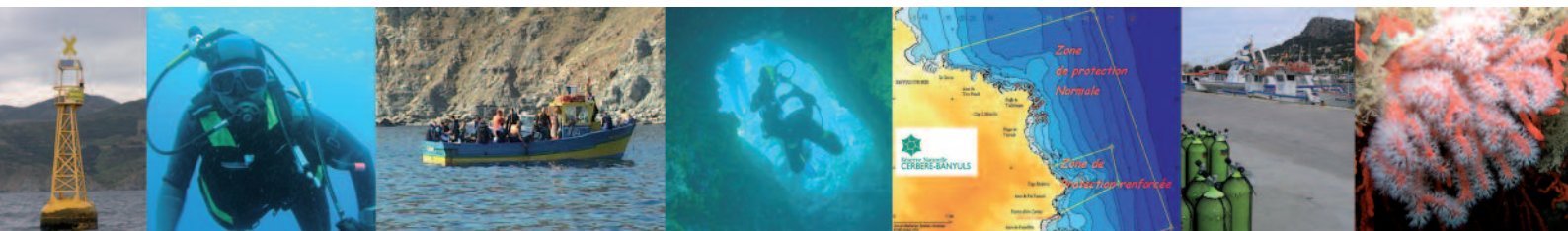
These actions have consequences on the space concerned in particular on its quality or its integrity. **Impacts, even environment disturbances, can result from this directly or indirectly:**

- the consumption and increased occupation of natural space (Augier and Boudouresque, 1970; Picard, 1978; Meinesz et *al.*, 1981; Astier, 1984; Peres, 1984; Augier, 1985; Bourcier, 1989),
- the transformation of space, the loss of the origin integrity (biodiversity) (Picard, 1978; Ardizzone and Pelusi, 1983; Astier, 1984; Jorajuria, 1984; Augier et *al.*, 1988; Boucier, 1989; Athias-Binche, 1996),
- modification of alive resources stocks (Bellan-Santini and Picard, 1984; Athias-Binche, 1996),
- pollution by rejections or discharges with chronicle accidental characters (Augier et *al.*, 1977; Augier and Sellier, 1978; Boudouresque et *al.*, 1980; Bourcier, 1982; Marcot-Coquegniot, 1983; Marcot-Coquegniot et *al.*, 1983; Augier et *al.*, 1984a, B; Peres, 1984; Pergent et *al.*, 1985; Augier et *al.*, 1988; Charbonnel et *al.*, 1999; Pergent et *al.*, 1995), - production of solid waste (Moreteau, 1981; Porcher, 1984; Porcher and Jeudy de Grissac, 1985; Centene, 1992; Charbonnel et *al.*, 1999).

However, the MPA should not be regarded as simple pieces of nature, but as tools at the service of a sustainable oceans and littoral management. If they protect the significant environments and the threatened species, they also make it possible to increase the productivity of fishing places, to control the various uses of the sea, to develop sustainable tourism and to create new activities which generate direct or indirect employment.

Many Mediterranean MPA do not have sufficient means to be managed correctly so that real measures of conservation can be done. The organization and the regulation of the various uses at sea, commercial fishing or of leisure, spear fishing, scuba diving, damping, navigation, scientific research, swimming, etc are not always optimal.

The MPA often misses qualified personnel, average materials (boats, beaconing, infrastructures, etc.) and financial and even management structures.



2 - The MedPAN network

MedPAN is a network of managers of MPA in the Mediterranee.

This network was constituted within a three years duration (2005 - 2007) project, financed by the initiative Interreg IIIC Southern zone. It gathers 23 partners of 11 countries of the Mediterranean circumference, including 14 European partners (France, Italy, Greece, Spain, Malta, Slovenia) and 9 partners of nonEuropean countries (Morocco, Tunisia, Algérie, Croatia, Turkey).

The coordinator is the WWF - France. These partners manage more than 20 MPA and work on the creation of several sites.

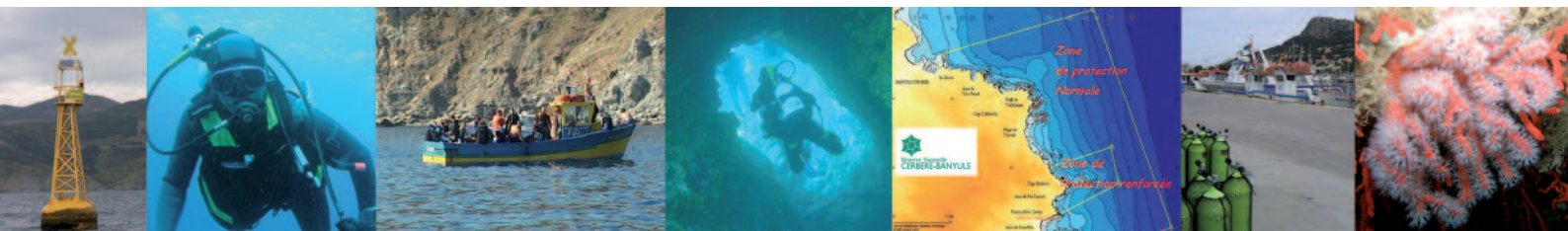
The network aims to facilitate the exchanges between Mediterranean MPA in order to improve the effectiveness of the management of these territories. In particular, the network allows:

- to promote between managers the division of experiments and good practices,
- to propose solutions to the problems of MPA management,
- to improve managers competences ,
- to make known the role of the MPA and support their recognition,
- to diffuse common messages to all the MPA.

In order to meet these aims, the MedPAN network sets up a certain number of actions:

- it organizes several workshops each year on problems of management common to all of the MPA,
- it finances the realization of studies,
- it produces methodological tools intended to help the managers in their daily work.

Among the many activities to be practised in the MPA, scuba diving made true great strides, mainly within protected areas. Also, **on the initiative of the Natural Marine Reserve of Cerbère-Banyuls where it became the headlight activity, the MedPAN network was interested in the problems of management and the follow-up of the diving.**



3 - Scuba diving

At the beginning of the XXème century, tourism in the Mediterranean basin remained a limited and reserved activity for a privileged elite.

Then within the 50's, a democratization process started to develop thanks to a generalized growth of the richness and consumption. **Tourism became a mass phenomenon then, and technological progress also applied to the techniques of diving.** In 1935, Yves Le Prieur, a French inventor, improved his diving-suit and created the first club of scuba diving in the world. Consequently, the deep-sea activities became activities of pleasure related to the sea.

A more pressing and undifferentiated request then was created, depending on tourism and focussed in Europe for the estival period. The development of diving from the 60's led to the emergence, at the sides of the federations, of training agencies of commercial vocation (ACUC, Barakuda, IDD, IDEA, NASDS, PADI, SNSI, SSI, etc). These companies propose standardized training, with a teaching equipment available in several languages (books, videos, etc).

Today, mass tourism tends to be different and its environmental quality assurance is increasingly stronger. **In this context, the development of subaquatic tourism, related to the interest growing for the marine environment, the richness of the landscapes, fauna and flora, finds its place.**

The tourist is like a spectator of the underwater life and sometimes like an actor. Diving is at the same time a contemplative and sportive activity. Consequently, certain measures are essential in order to guarantee the safety of the practice but also the environmental integrity of the diving sites.

Today, the distribution of the diving leisure is not uniform within the seas of the world. Certain sites, because of multiple criteria such as beauty, biological or morphological originality, the distance compared to the coast, are more prized than others. These sites are therefore submitted to an important frequentation even with an over-frequentation which can threaten their balance and even sometimes deteriorate them (Bardelelletti, 2005). **As a result, it appears essential to consider a sustainable diving management to allow sea-beds to preserve their richness without making them systematically inaccessible to the man.**

The promotion of a "subaquatic ecotourism", where the discovery and the respect of the marine environment have priority, is then possible.

Table 1 presents some figures which give a framework reference where each MPA can position. No conclusion can be drawn from these figures of frequentation because the methods used to collect the data are not standardized.

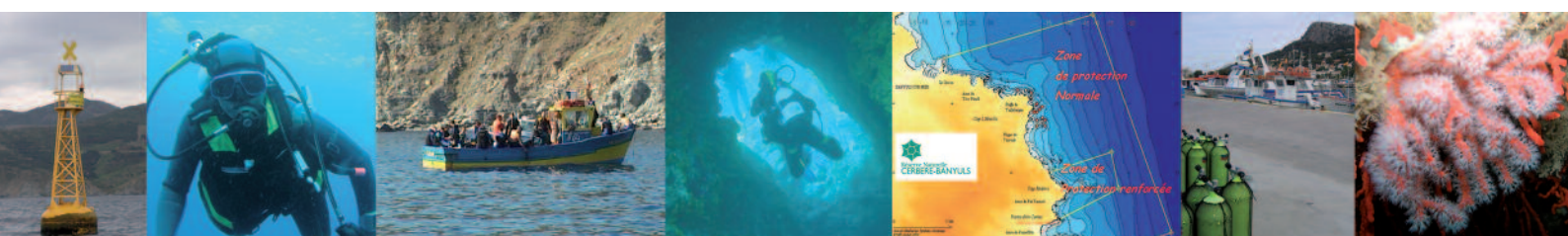
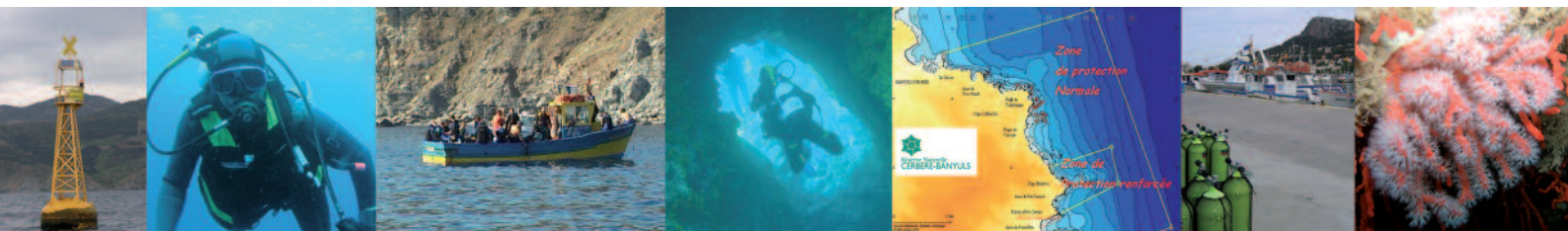


Table 1: Frequentation data of some Mediteranean MPA

Marine Protected Areas	Dives numbers / year	Diving sites	Mooring buoys	Diving centers coming to MPA	Total surface (acres) of MPA	Diving surface (acres)	Time Period
Cabo de Palos Marine Reserve– Islas Hormigas (Spain)	15000	6	5	10	1898	50	January to december
Marine Protected Area of Islas Medas (Spain)	60800	9	29	20	551	51	April to october
Natural Reserve of the Bouches de Bonifacio (France)	30000 à 35000	11	8	44	80000	15	Mid-may to late september
Natural Reserve of Cerbère-Banyuls (France)	25000	25	15	24	650	44	April to october
National Park of Port-Cros (France)	45000	14	14	50-60	1250	42,3	April to october
Protected Natural Marine Area of Cinque Terre (Italie)	400	5	7	5	4592	?	March to october
National Parc of Kornati (Croatie)	1000	9	0	?	16800	240	May to october
National Marine Parc of Zakinthos (Grèce)	6750	3	0	4	9000	?	May to october
Especially Protected Area of Kekova (Turquie)	9300	15	10	12	11500	3000	April to october



However, the development of this activity can generate a certain degradation of the marine environment, formerly caused by boats dampings. The divers can also disturb the environment in various ways:

- inopportune blows of fins on the bottom or the walls because of a bad stabilization,
- disturbance of the animals,
- taking away or animals feeding,
- voluntary destruction, in particular sea urchins, in order to attract fish close to the divers at the time of the baptisms.

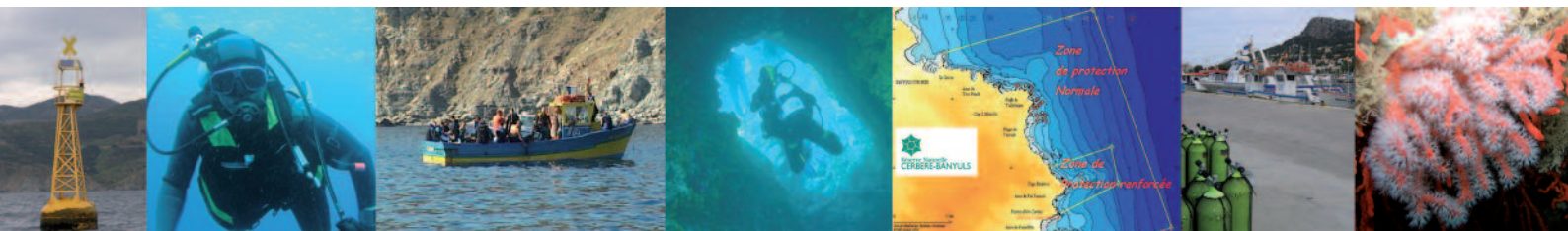
In the long run, a too important multitude and a repeated concentration of divers on the same site are likely to involve an irreversible degradation of the environement leading to a biological impoverishment of the funds. The examples do not miss among the many zones of diving of the planet (Bardelletti, 2005).

However, the installation of an integrated management of the site can limit the effects of these activities.

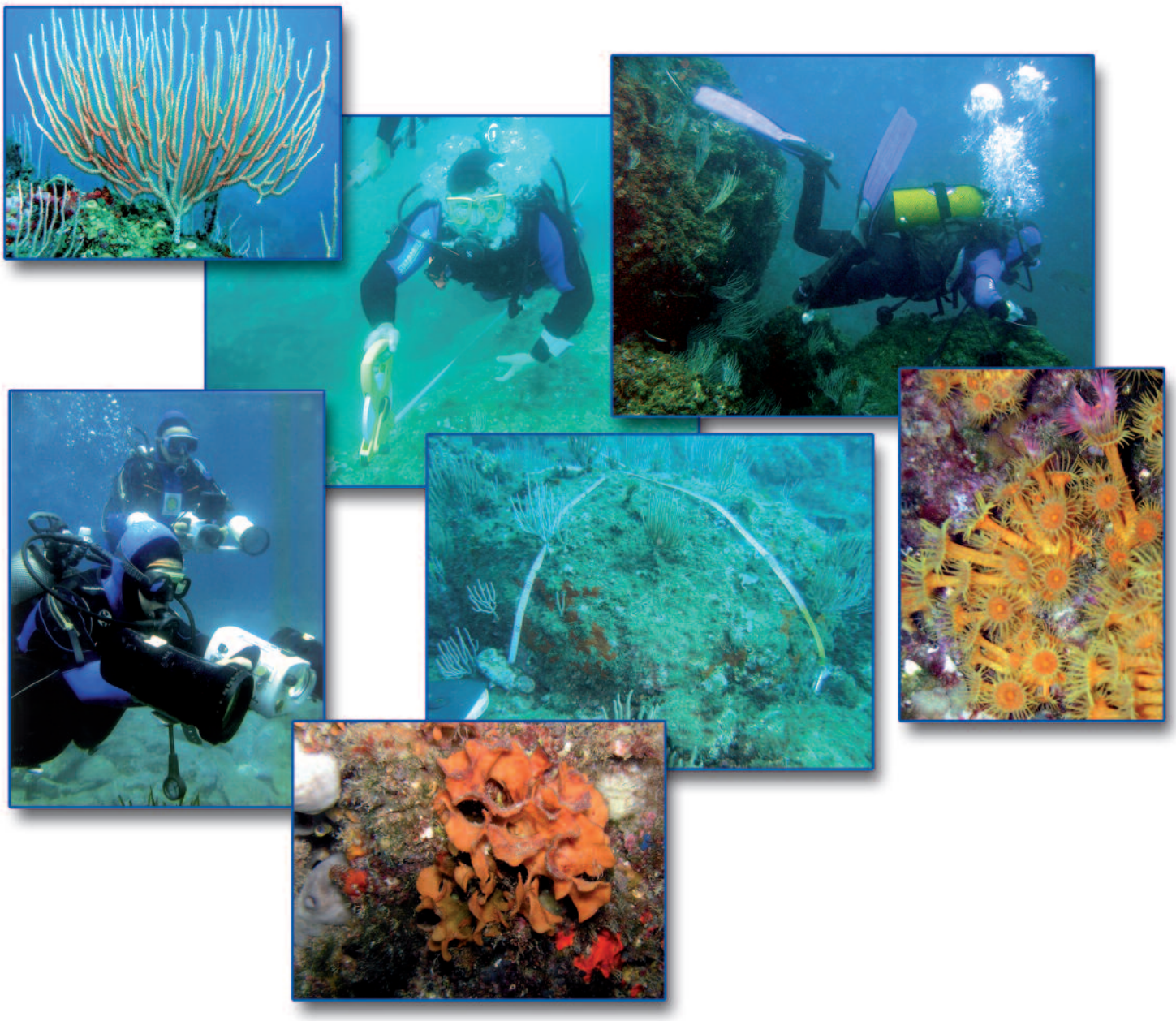
Scuba diving is an increasingly lucrative element for tourism in the Mediterranean sea, particularly these last years because of technical progress in the equipment and interest growing for nature, the conservation and the environment problems (Orams, 2002; Barker and Roberts, 2004).

The interest of the diver for MPA develops but this phenomenon can involve an impact on the marine organizations and the significant communities. Diving is one of the activities which can profit the most of the creation of a protected zone, even if the activity is generally prohibited in a zone of reinforced protection (Francour et *al*., 2001). The biological and ecological consequences of the protection measures attract many divers which come in the protected zone but also in the adjacent zones.

The many economic surveys indicated that the MPA generated an important underwater tourist industry (Brown et *al*., 2002). Moreover, when the diving is partially or completely prohibited in the reserve, the local clubs allot and exploit the image and the status of the MPA for their publicity.



Diving follow-up and impact studies



1 - Activity follow-up, frequentation and load capacity

The follow-up is a key point when the activity management is considered. Indeed, **to know the characteristics of diving in a MPA** (zones of evolution, practice intensity, type of practice, etc.) **is an essential base in order to understand which are the points to be improved and which are the management efforts to be undertaken.**

An **evaluation of the divers' number coming on the sites** can be undertaken in order to know their frequentation. This quantification makes it possible to highlight certain parameters (sites privileged for the activity, period of time, types of practice, etc). The objective is then to understand where and when measures of management must apply (Fanciulli et *al.*, 2006).

Various tools can be used for this type of follow-up (Table 2):

- questionnaire given to the divers (Natural Marine Reserve of Cerbère-Banyuls, Natural Marine Reserve of Cabo de Palos - Islas Hormigas),
- divers and boats counting (Natural Marine Reserve of Cerbère-Banyuls, Natural Reserve of les Bouches de Bonifacio) carried out at the time of patrols at sea ensured by the coast guards,
- diving code of good practice associated sometimes to a frequentation notebook (Natural Marine Reserve of Cerbère-Banyuls, National Park of Port-Cros),
- diving licence (Natural Marine Reserve of Cabo de Palos - Islas Hormigas, Natural Marine Reserve of the Islas Medas).

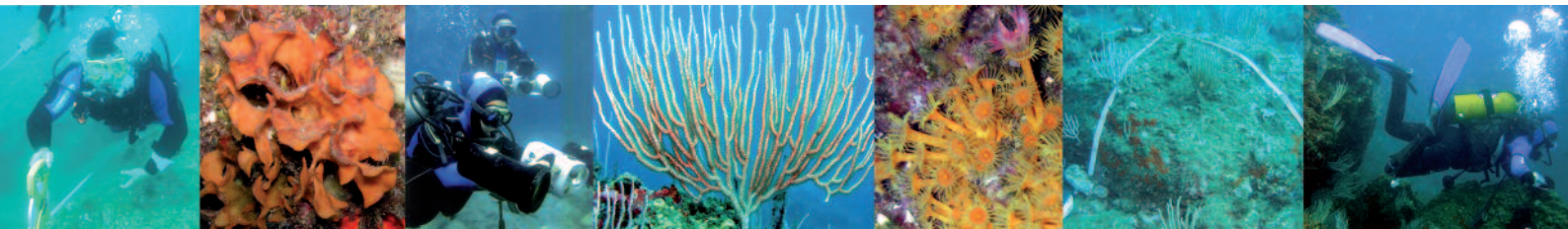
Marine Protected Areas	Tools	Advantages / Disadvantages
Small size team	Frequentation notepad	Data limited on a declaratory basis
Average size team	Frequentation notepad Observation and counting during the patrols	Complementary but nonexhaustive data
Big size team	Frequentation notepad Observation and counting during the patrols Frequentation studies Diving licence Damping management	Real data

Table 2: Set up of diving activity follow-up tools within the MPA

Various parameters can then be studied:

- profile of the diver (free or licenced diver, level of diving, gender, age, etc),
- attended sites,
- the knowledge of the MPA existence,
- the motivation to come to a MPA,
- the knowledge of the existence of a code of good practices for divers
- their opinion on the positive impact or not of the MPA on the quality of the marine environment, etc

These data make it possible to visualize socio-economical aspect of the activity and to estimate, after interpretation, the sites capacity to support the divers' presence.

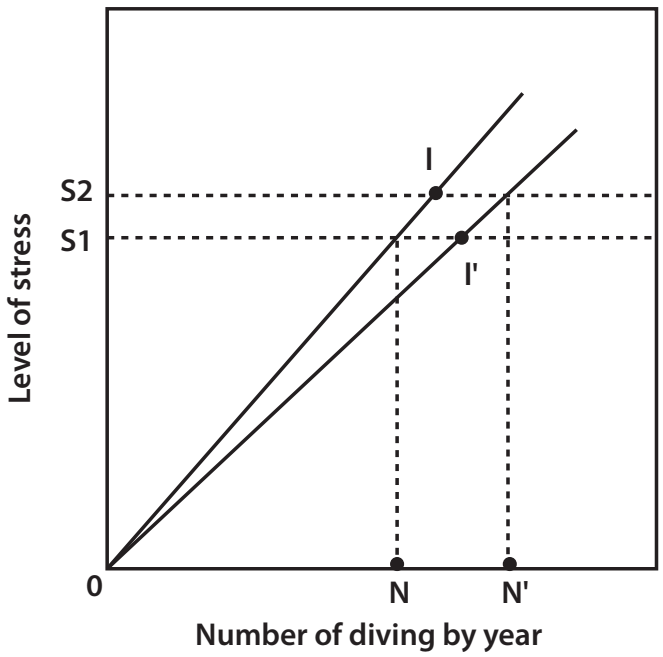


Developed during the Seventies, the concept of load capacity makes it possible to evaluate the overuse of the resources and the over-frequentation of the users within a space given (Dixon et *al.*, 1993; Davis and Tisdell, 1996). It is defined as the level of use which a natural resource can support without an unacceptable degree of degradation of the identity or quality of this resource or the use that it is made. The analysis of this load capacity rests on ecological and human factors. But the load capacity should not be confused with the threshold of maximum frequentation that corresponds to the critical level on top of which degradations appear (PAP/RAC, 1997).

The study of Davis and Tisdell (1995) and the one of Tratalos and Austin (2001) gather estimates of the bearable number of divers for a site. In certain studies, data of bearable capacity were established but they often vary from one study to another (Hawkins and Roberts, 1992a; Dixon et *al.*, 1993; Scura and Van' T Hof, 1993; Davis and Tisdell, 1996; Zakai and Chadwick, 2002; Tratalos and Austin, 2001):

- 500 dives per annum in the Virgin Islands (very fragile site),
- 4000 to 6000 dives per annum in the Caribbean,
- 5000 dives per annum and per site in the Marine Park of Bonaire,
- 5000 to 6000 dives per annum in Eilat and the National Park of Ras Mohamed,
- 10000 to 15000 dives per annum (very large site) in Sharm el Sheikh.

Dixon et *al.* (1993) developed a simple model between the number of divers and the level of sudden stress made to the environment (Picture 2). The S1 level represents the level of stress where degradation becomes perceptible for a number of dives per annum N1. Below this threshold, the impacts are small or null. The authors suggest that this threshold can be increased (S2) thanks to a better management of the activity. The improvement of measures of management does not increase the tolerance of the marine environment to the stress but allows a better distribution. This best management can rest on various measures (rotation of the sites of diving or the divers on the same site, divers' awareness, etc). **The combination of management on the ground and the education of the divers then increase the load capacity of the site** with N2 dives per annum. Despite everything, intermediate levels can be reached out in I (installations of diving sites: rotation, new sites, etc.) and I' (improvement of the divers aptitudes: awareness, better technical level, etc.) (Francour, 2002).



Picture 2: Evolution of the maximum number of divers able to be supported by the marine environment according to management measures and education of the divers (stress level / number of dives per year) (modified according to Francour, 2002)

Few studies have been carried out in the Mediterranean sea (Zabala et *al.*, 2002). This concept of bearable capacity should thus be adapted to the Mediterranean sites (Mediterranean biological communities, topography, weather conditions , etc.) by considering the specific characteristics of each studied site (Manca and Palmisani, 2006).

The managers will then be able to adapt and improve management of the site in order to preserve its ecological state while being based on different approaches according to the institutional, socio-economic and administrative specific context (Table 3).

Protection / Management	Frequentation	Activities development	Medium degradation	Balance Economy / Protection
Absence	Saturation	Free and anarchistic	Maximum	Economy
	Maximum	Intense	Important	
Optimal management and reasoned protection	**Load capacity**	**Sustainable development and education**	**Controlled**	**Equilibrium**
Total protection and little management	Minimum	Moderate	First alarming signs	Protection
	Absence	Restricted to alternative tourism	Minimal	

Table 3: Load capacity and optimal management of a Marine Protected Area (modified according to Francour, 2002)

Examples of activity follow-up:
- National Park of Brijuni (Croatia),
- National Park of Kornati (Croatia),
- Natural Park of El Estrecho (Espagne)
- Natural Marine Reserve of Cabo de Palos – Islas Hormigas (Spain),
- Natural Marine Reserve of Islas Columbretes (Spain),
- Marine Protected Areas of Islas Medas (Spain),
- Natural Marine Reserve of Masia Blanca (Spain),
- Natural Marine Reserve de Tabarca (Spain),
- Natural Marine Reserve of Bouches de Bonifacio (France),
- Natural Marine Reserve of Cerbère-Banyuls (France),
- National Park of Port Cros (France).
- Protected Marien Area of Capo Carbonara (Italy),
- Marine Protected Area of Isole Ciclopi (Italy),

Available documents:
- Questionnaire,
- Codes of good practices and activity notebooks,
- Diving licence.

2 - Impact studies on *in situ* scuba diving : examples of few MPA

A great quantity of studies have been carried out in the marine reserves in order to evaluate the damages caused by the divers on the coral communities and to thus establish management tools such as "load capacities of divers" (Dixon et *al.*, 1993), estimated in the Park of Bonaire at 4000-6000 divers/site/year. However, **the studies on the diver impacts mainly developed in the tropical seas** (Tilmant, 1987; Tratalos and Austin, 2001). In the Mediterranean sea, Sala et *al.* (1996) showed the bad condition of the populations of Bryozoaires in the zones attended compared to the zones few or not attended. The damage caused by the divers, considered normally as little, results from the blows of fins, trampling, kneeling, the shocks caused by the tanks or any other part of the equipment. **These actions have various consequences on the sublittoral rock communities such as the colonies of Bryozoaires weaker in density** (Sala et *al.*, 1996), **changes in the models of algal cover at the level of superficial rocky sectors** (Milazzo et *al.*, 2004), **a handing-over in suspension of the sediments** (Rogers, 1990), **the presence of broken coral skeleton** (Tilmant, 1987; Rodgers and Cox, 2003) **and of damaged tissues** (Hawkins and Roberts, 1992). However, the degree of change of the MPA benthic communities, the natural variations (spatial and temporal) or because of the non-extractive human activities, in the totality of the Mediterranean lower rock communities, is still unknown.

2.1 - Studies on divers behaviour

Several MPA have used this approach.

Generally the observation is made in a discrete way; the diver is not informed of the follow-up so that its behaviour is not influenced. The observers often keep a **distance of approximately 5 meters** from the divers. This distance is adapted according to the visibility. **The observation duration is of approximately 10 minutes** for the majority of the studies (Rouphael and Inglis, 1997, 2001; Zakai and Chadwick-Furman, 2002).

The noted parameter is the number of contacts with the substrate carried out by the diver. This parameter can be specified, indexed according to the type of contact (Roberts and Harriott, 1994; Prior et *al.*, 1995; Harriott et *al*, 1997; Rouphael and Inglis, 2001; Zakai and Chadwick-Furman, 2002; Barker and Roberts, 2004):

- **direct or indirect,**
- **voluntary or not voluntary,**
- **carried out with the hand, the knee, the pressure gauge, the fins, etc.**

The variation of these parameters is then studied according to various factors:

- **topography** (vulnerability of falling, caves, etc.) and **characteristics** (current, waves, swell, organized damping, site accessibility , type of substrate, etc.) **of the site** (Rouphael and Inglis, 1997; Zakai and Chadwick-Furman, 2002; Barker and Roberts, 2004),
- the **divers level** (Hawkins and Roberts, 1992; Harriott et *al*, 1997; Rouphael and Inglis, 2001, Zakai & Chadwick, 2002),
- **the use of a camera** (Hawkins & Roberts, 1992; Rouphael and Inglis, 2001; Barker and Roberts, 2004),
- the **gender of the diver** (Rouphael and Inglis, 2001),
- **briefing and interventions** (Medio et *al*, 1997; Barker and Roberts, 2004),
- the **degree of the impact importance** (Barker and Roberts, 2004),
- the **period of observation during the dive** (Harriott et *al*, 1997; Rouphael and Inglis, 2001; Barker and Roberts, 2004),
- **the diver's position** (Garrabou et *al*, 1998).

On the sites of the Marine Reserve of Cabo de Palos, the study carried out since 2003 by the University of Murcia relates on the divers behaviour and various parameters have been recorded (Garcia Charton et *al.*, 2003; 2005):
- the number of supports,
- the number of contacts with the body or the equipment,
- stone reversal,
- feeding of the fish, etc.

To ensure the protection of the diving sites, **the manager of the Natural Reserve of Bouches de Bonifacio** decided to control the divers behaviour on one of the attended sites (Le Pelu) during the summer 2005. In this MPA, a code of good practices is in place and the site is equipped with mooring buoys (for the diving centers and the private diver). Methodology is as follows:
- control at the time of 60 dives is 350 divers,
- follow-up of the various sling loads being on the site,
- divers underwater, not advised of their arrival,
- status of the controlled diving centers .

For this follow-up, several criteria of evaluation have been retained:
- the status of the diving centers,
- the number of divers per sling load,
- the number of contact with the bottom,
- the level of the divers underwater beginner/ average/experienced,
- harmful sound effects and the feeding.

The major problem remains the contact with the bottom; recommendations on this subject appear in the code of good practices. The feeding of the groupers has been observed only once during the study.

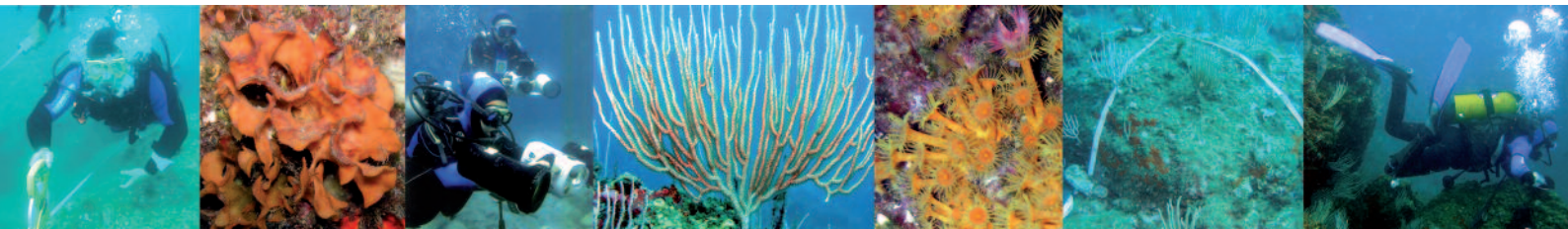
This point was evoked with the various centers from Cosica and Sardinia signatories of the code which promise to improve this situation for the next summer season.

Within the MPA of Islas Medas, a follow-up carried out at the time of the summer season 2004 related on the space occupied underwater by the divers and more particularly the paths they took (SUBMON, 2004). The various substrates on which the divers moved were recorded as well as the time spent on each one of these substrates. On the 51 acres where diving is authorized, the study highlighted that only 7 acres were exploited what accounts for only approximately 14% of space

In the Natural Marine Reserve of Cerbère-Banyuls, a behavioural description of 53 sling loads was carried out in July and August 2006 (Javel and Riocreux, 2006). Each sling load is studied over the duration of the diving and various parameters are taken into account:
- characteristics of the sling load (number of divers, level, experience, nature of the leaders, bathymetric parts explored, duration, etc),
- number of contacts between the diver and the substrate with a distinction between the voluntary/involuntary contacts, hands/fins/body, etc.
- various observations (stone reversal, feeding, organisms collection, etc).

In addition, as in the MPA of Islas Medas, the divers' move was studied in order to determine the surface explored by the sling loads. The method was based on the follow-up of the sling loads in diving with a towed buoy on which a GPS in continuous recording is fixed. Thus, on the 29 hectares of the studied zone (Cap l'Abeille and îlots des Tynes), the study highlighted that only 7 hectares are exploited.

During such studies, it is important that the professional diving structures are associated and implied. The presentation and the restitution of the results obtained will enable them to determine the axes of teaching to deepen (fin movements, stabilization, briefing, awareness and education on the marine environment, etc).



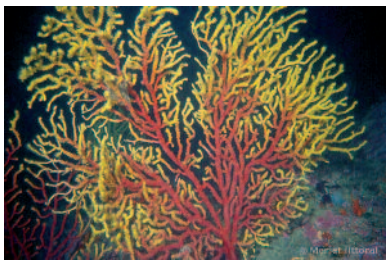
2.2 - Impact study on the benthos

The methods generally consist of **a follow-up of the benthic communities' evolution.** Several methods were used:

- **the use of quadrats and transects:** by comparing, for example, sites more or less attended with very attended sites. The density, the size, the place of the organisms such as the gorgones are recorded underwater directly or using a photograph (Hawkins and Roberts, 1992; Sala et *al.*, 1996; Rouphael and Inglis, 1997a, b; Hawkins and *al.*, 1999; Schleyer and Tomalin, 2000; Tratalos and Austin, 2001).
- **"BACI" and "Beyond BACI":** technique of study suggested in order to detect ecological degradations in the natural habitats. This concept rests on a sampling before and after the impact (Garrabou et *al.*, 1998; Francour and Koukouras, 2000; Rouphael and Inglis, 2002).

- **the Index of damage to the corals** (TDCI, Coral Ramming Index): This management tool of the sites is proposed by Jameson et *al.* (1999) and could be used in order to measure the severity and the extent of the corals damage.
- **the "suitable Answer":** it was used on several occasions to examine the response of the watery ecosystems to a certain number of stress factors (Wielgus et *al.*, 2002).
- **the mapping of the fixed communities.**

The studies in the Mediterranean are focussed **on the follow-up of corals** (Ballesteros et *al.*, 1999; Francour P. and Koukouras A. 2000) and more particularly with certain species which constitute it and which are **biological indicators:**



- *Pentapora fascialis*, orange bryozoaire (Garrabou et *al.*, 1998; Sala et *al.*, 1996),
- *Eunicella singularis*, white gorgone (Blouet et *al.*, 2006; Bonhomme et *al.*, 2006);
- *Paramurcia clavata*, red gorgone (Pichot F, 1998; Coma and *al.*, 2004; Harmelin and Garrabou, 2005),
- *Corallium rubrum*, red coral (Sala et *al.*, 1996),
- *Alcyonium acaule*, alcyon Mediterranean.

In the study of Sala et *al.* (1996), *Pentapora fascialis* was selected as indicator of the diving abrasive effects. The scientists notice that this species is present in lower density and size on the sites of diving. On these sites where the gorgones are used as shelters for *Pentapora fascialis*, it is present only under the gorgones. In the zones that haven't been dived in, *Pentapora fascialis* is present everywhere.

The white gorgone *Eunicella singularis* was selected to follow the dynamic evolution of sites and the effects of the installation of mooring ecological devices (Blouet et *al.*, 2006; Bonhomme et *al.*, 2006). It represents the species most representative of these sectors (Marine area of Cap d'Agde, Marine Natural Reserve of Cerbère-Banyuls).

After three years of monitoring in Cabo de Palos - Islas Hormigas Marine Reserve, the scientists of Grupo de Investigacion "Ecologia y Ordenacion de Ecosistemos Marinos Costeros" Departamento de Ecologia E Hidrologia, Universidad de Murcia (Spain) showed that the white populations of gorgones, *Eunicella singularis*, are damaged by the divers which attend these sites (Garcia Charton et *al.*, 2003; 2005).

Other authors (Salted et *al.*, 1996) observe a bigger average size of the red coral, *Corallium rubrum*, in the non-attended sites.

2.3 - Impact study on fish communities

Several methods can be used:
- points of counting (Bohnsack and Bannerot, 1986) used by Hawkins et *al.* (1999),
- discrete visual census (DGC, Discrete Group Censucing), (Greene and Shenker, 1993).

In 1997, a study was undertaken, within the Natural Reserve of the Cerbicale-Lavezzi Islands, in order to study the interactions between the grouper and the divers behaviour (Ehlinger, 1997).

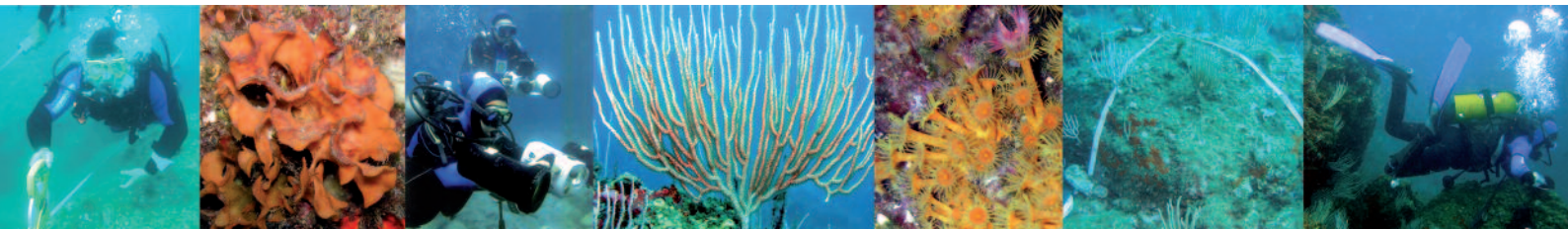
Examples of installation of impact studies:
- Natural Marine Reserve of Cabo de Palos – Islas Hormigas (Spain),
- Wildlife Parc of El Estrecho (Spain),
- Natural Marine Reserve of Islas Columbretes (Spain),
- Protected Marine Zone of the Islas Medas (Spain),
- Fish Marine Reserve of Ses Negres (Spain),
- Natural Marine Reserve of Tabarca (Spain),
- Natural Marine Reserve of Bagnas (France),
- Natural Marine Reserve of Bouches de Bonifacio (France),
- Natural Marine Reserve of Cerbère-Banyuls (France),
- National Park of Port Cros (France).
- Protected Natural Marine Zone of Isole Tavolara - Punta Coda Cavallo (Italie),
- Protected Marine Zone of Miramare (Italie),
- Protected Zone of Larvotto (Monaco),

Available documents:
- Protocols,
- Reports.

3 - Proposal of a protocol for studying scuba diving

Biological monitoring aims at detecting the modifications of the alive systems, caused specifically by humans. **In order to detect the effects of the human activities on the biological systems, biological monitoring must study the human disturbance independently of the disturbances which occur naturally.** Biological monitoring does not need to pile up information on each dimension of normal variation. The goal is to detect, evaluate and communicate the state of the biological systems, and the consequences of the human activities on these systems. Therefore, multiple methodological approaches were employed for the various communities on the level of the rock deep seas. For example, sampling using video and photograph are generally employed for the study of coral reefs communities (Zakai and Chadwick-Furman, 2002), while the communities dominated by the algae are generally studied using sampling on the level of the representative sectors (Boudouresque, 1971; Ballesteros, 1992), or by measuring the algal cover on the permanent quadrats (Dayton et *al.*, 1992). However, the variations within the ecological communities are many and obvious (García Charton et *al.*, 2004). These variations are often spatial and temporal (Dayton and Tegner, 1984). The study of the spatial model is crucial initially in order to understand the causes of the distribution and the abundance of the organisms, and to provide a base to supervise their changes on the long term due to natural variations or variations caused by the man (Underwood, 1990).

The protocol suggested is based on a long-term monitoring of the benthic communities using various techniques of sampling (sampling by photography, visual census) and while concentrating mainly on a particularly significant species, *Eunicella singularis* (white gorgone). Moreover, an experiment is proposed in order to measure the rates of sediments put in suspension by the divers. The strategy, the design and the sampling procedures will be similar to those developed by Grupo de Investigacion "Ecologia y Ordenacion de Ecosistemos Marinos Costeros" Departamento de Ecologia e Hidrologia, Universidad de Murcia and used with the Marine Reserve of Cabo de Palos - Islas Hormigas (Spain). Lastly, it would be particularly interesting to obtain data comparable with the other Mediterranean marine reserves to overrule the lack of comparative studies.



3.1 - Direct observation of the divers' behaviour

A direct observation of the divers will be carried out in order to know the characteristics of the impact; this involving the professional diving structures.

Data capture will be done using a submersible card where will be put down certain actions (impacts) achieved by the divers and their effects on the benthic communities. At the time of each immersion, each observer will study between 2 and 5 divers randomly chosen for a 10 minutes period per diver (period to be adapted according to means available). **Never, the diver will have to know the presence of the observer so that his behaviour does not change**. However, if the diver shows a detailed attention towards the observer, the observation will stop.

At the time of the observation of the diver, various parameters are to be taken into account:

- the number of beats of fins near the bottom (not of contact but possibility of sediments put in suspension),
- the number of supports during a certain time using the hands, knees, fins or all the body,
- the number of short or specific contacts using the hands, the knees, the fins or all the body,
- the number of contacts carried out by the material (fins, tanks, pressure gauge, camera or video),
- the displacement (with or without reversal) of stones or any other hard substrate,
- taking away of organizations,
- the feeding which consists in nourishing the organisms to attract them.

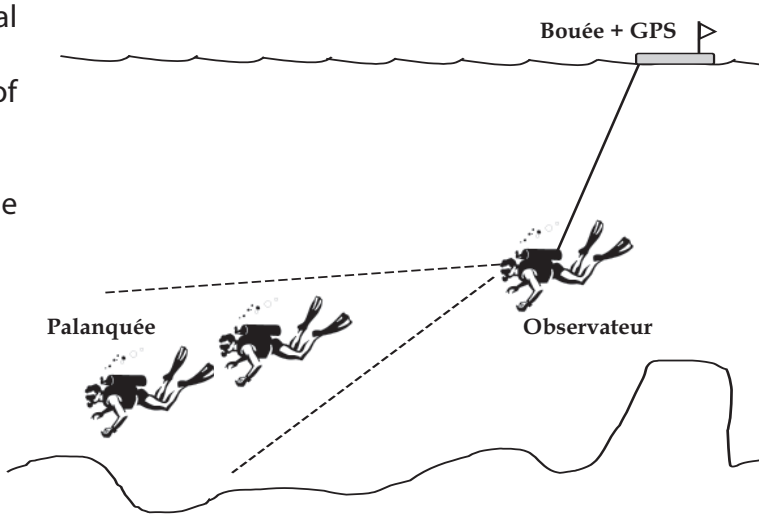
For each one of these actions, the corresponding effects on the benthic communities will be specified:

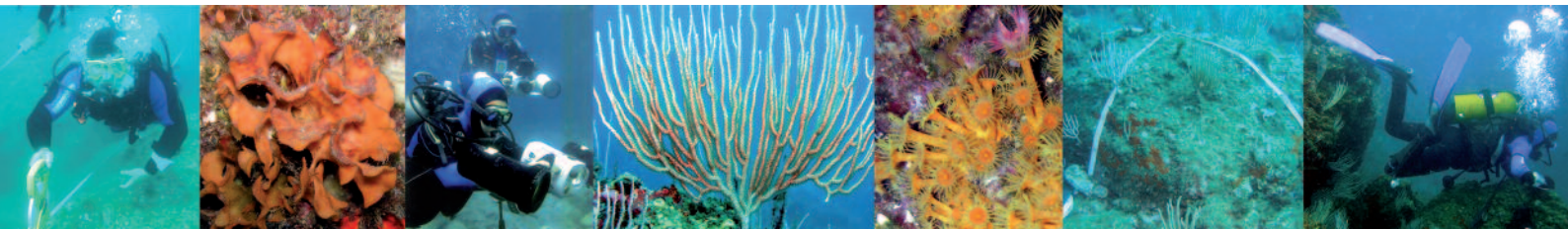
- sediments put in suspension,
- contact with fragile organisms,
- wound of fragile organisms,
- separation of plants,
- separation of sessile organisms,
- separation of semi-sessile organisms,
- death of organisms.

In complement, several readings of depth will be taken using a diving computer in order to know the average depth of evolution of the divers. Three categories of depth will be thus defined:

- category 1 (depth lower than 10 m),
- category 2 (depth ranging between 10 and 20 m),
- category 3 (depth higher than 20 m).

Lastly, **the data obtained will be geo-referenced.** They will allow to define the zones attended and consequently impacted or not by the activity. **The sites thus targeted (impacted and pilot zone) will be used for the installation of the follow-ups described hereafter.**





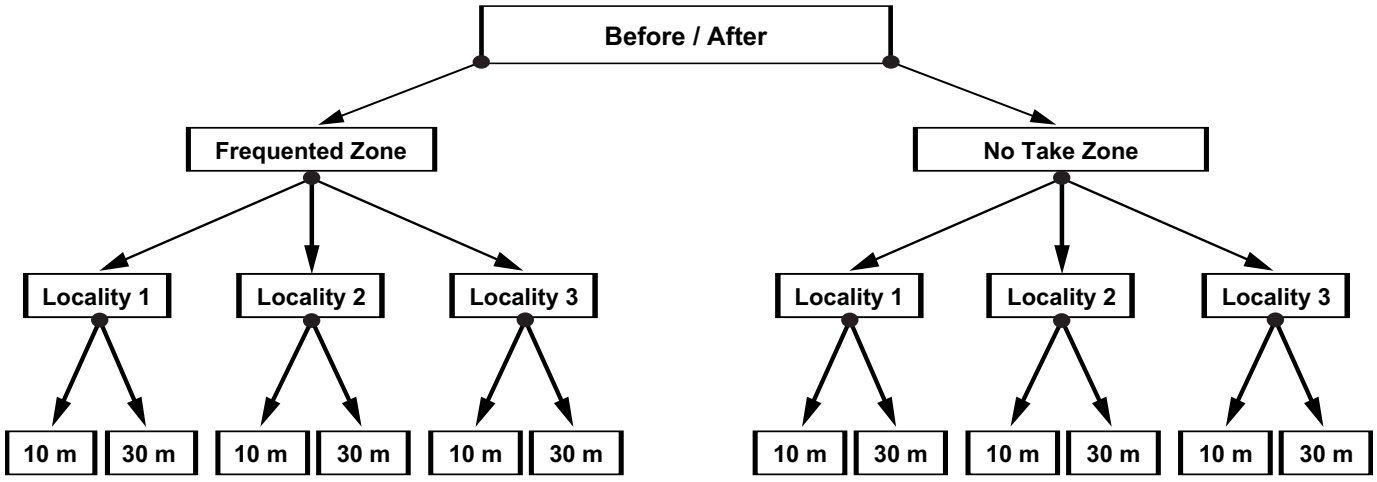
3.2 - Follow-up of the benthic communities

This follow-up will try to propose the changes affecting the benthic communities related to the practice of scuba diving within the MPA but not related to natural variations.

Two zones (frequented by divers and no take zone) and **three locality within each zone** will be selected according to their proximity thus ensuring homogeneity of the benthic communities and the existence of the similar environmental factors.

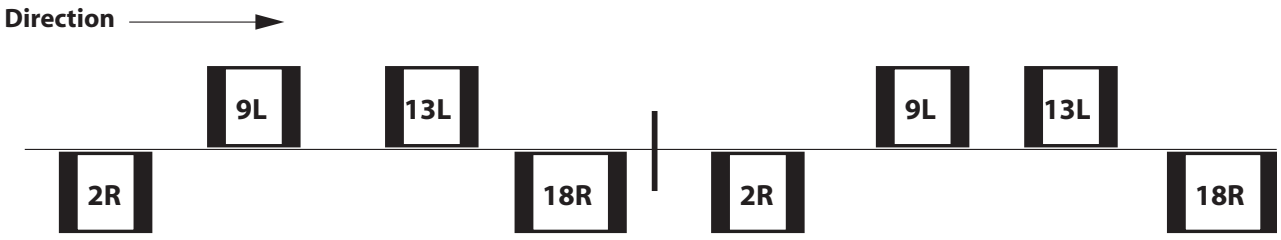
Two sampling campaigns will be carried out: before the summer season during which the pressure induced by diving is maximum, and **after this summer season.**

Sampling will consist on a visual census by diving. 12 permanent transects of 50 m length (Picture 3) (before and after the summer season) will thus be carried out. Various parameters (starting point of the transect, orientation, depth) will be raised in order to be able to repeat sampling under identical conditions.



Picture 3: Installation of sampling (according to Garcia-Charton)
(Before / After the summer season. Highly frequented / not frequented zone)

The transect will be materialized by one decametre on which 8 quadrats of 1m² will also be placed (Picture 4). In each site, sampling will be carried out with two different depths in order to include the depth factor if possible.

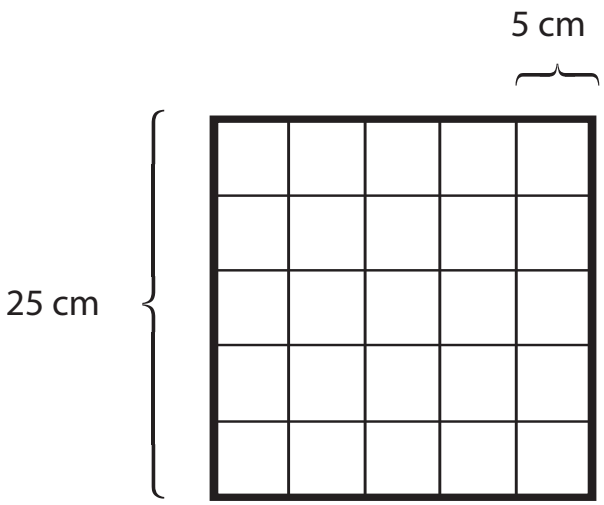


Picture 4: Provision of the quadrats along the transect. The number indicates the distance on the transect and the letter indicates the position (I: left and D: right-hand side; according to Garcia-Charton)

Along each transect, 8 quadrats of 1 m^2 will be carried out randomly. **Within the same quadrat, two studies will be carried out, on a small scale (25 X 25 cm) and with average scale (1 X 1 m).** Several species representative of the benthic communities will thus be studied using:

- **quadrats of 1 X 1 m where various species are counted** (Echinodermatous, Ascidies, tubicolous worms, etc.)
- **quadrat of 25 X 25 cm divided into 25 cells of 5 cm** (Picture 5) **to study the algae cover** (4 different morphotypes : arborescent, right, short and encrusting), **the "naked" substrate and the cover of certain species** (Sponges, Bryozoaires and Ascidies, etc). Sampling is carried out within the quadrats of 1 m^2. The number of the cell occupied by one of the various organizations is written down.

Series of photographs will be carried out along each transect in order to get a better appreciation of the benthic communities densities. The digitall camera will be fixed on a PVC reinforcement (Picture 6). The images thus obtained will have a surface of 0,35 m^2. The analysis will be carried out by superimposing a grid on each image, and by counting the number of cells occupied by each remarkable species.



Picture 5: Quadrat of 25 x 25 cm (according Garcia-Charton)

Picture 6: Rigid PVC reinforcement to be used for the photographic study (according to Garcia-Charton)

3.3 - Specific follow-up of Gorgones

The visual census by scuba diving is done along several transects on several sites before and after the summer in order to obtain data on various parameters:

- **Colonies density** (broken/upright),
- **Ratio broken / upright populations,**
- **Proportion dead colonies** (or wounded) **and visual estimation of necrose rate** (0%, 1-9%, 10-24%, 25-49%, 50-74%, 75-99% and 100%),
- **Various biometric parameters:** length, rectangular surface, width and total length of the branch.

The choice of the studied colonies is randomized in the PVC quadrats of 1 m^2.

Various statistical analyses can then be considered from the gathered data:

- Multivariate analysis used to synthesize the information from several variables, in order to explain and study the relationship between various variables (explicative methods),
- Variance analysis used to study the possible deviations of the populations from the mean (descriptive methods).

3.4 - Follow-up of sedimentation rate

A follow-up can be considered in order to detect the sediment put in suspension caused by the each diver. In order to examine the rate of sedimentation induced by the frequency of divers, **6 tests (0 way–order, 5, 10, 15, 20, 25 ways) are done. They are used to reproduce the passing of the divers on a path.** The sediment traps containing cylindrical PVC collectors (Figure 7) are installed on one of the three localities of the zone, at various depths (between 9 and 14 m at Cabo de Palos). Three replicates are carried out. The sediment trap are composed of a PVC tube of 5.5 cms of diameter and 10 cms in length (2 ratio; Airoldi and Cinelli, 1997), sitting on a metallic grid in order to stay in a stable upright position. The sediment collected in each trap is filtered using glass tubes and pre-weighted 25 mm Whatman paper. The filters are rinsed with distilled water in order to remove the salts, and dried at 60°C for 24h, before being weighted.

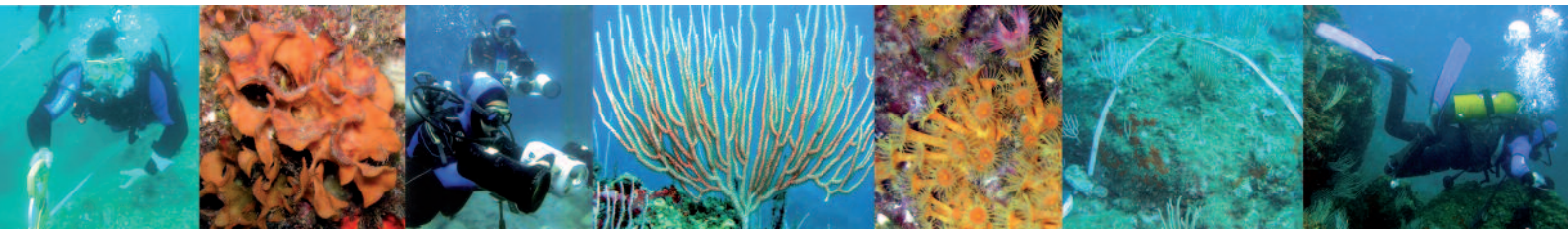
Figure 7 : Sediment trap with cylindrical PVC collector

This type of follow-up can not be considered in zones subject to high sedimentary constraints (for example the natural marine reserve of Cerbère-Banyuls**).**

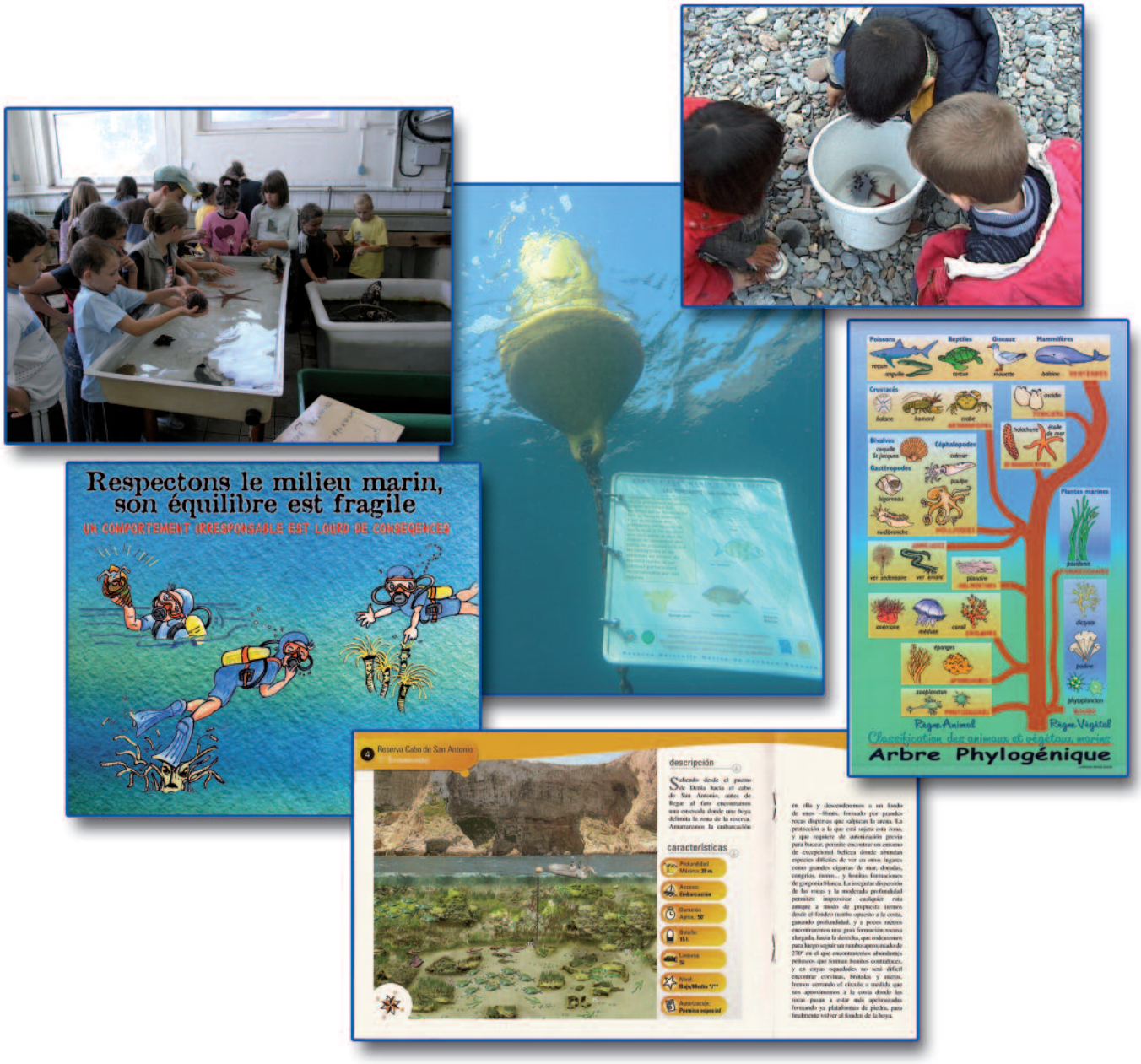
Following the previously cited studied, various management measures have been proposed :

- Rotation of dive sites in order to manage the relation number of divers / impact (Dixon et *al.*, 1993),
- Regulation of sub-marine photography (Dixon et *al.*, 1993),
- Environmental education of the divers (Dixon et *al.*, 1993),
- Transfer of training courses and « baptisms » on less fragile sites (Zakai and Chadwick-Furman, 2002),
- Implementation of a submarine path in order to channel the divers ; however the concentraton of divers on one zone can damage it and make it ininteresting to the divers (Hawkins and Roberts, 1992),
- The decrease of use of the more vulnerable zones (Hawkins and Roberts, 1992),
- The implementation of smaller groups which are easier to manage by the instructors (Tratalos and Austin, 2001),
- The immersion of artificial reefs in order to manage the conflict between preserving the nature and economical interests (Van Treeck and Schuhmacher, 1998, 1999),

The managers of MPA have to keep in mind that, depending of the objectives, the scientific surveys can sometimes be very demanding in terms of human, material and financial means. It is although not absolutely necessary to demonstrate an impact before considering management measures. On the basis of precaution principle, and relying on an educational approach, it is better to anticipate and incite the divers to be aware of the risks of disturbance. In Mediterranean sea, several measures are or can be applied in order to sensitize the socio-economical actors and to better manage scuba diving in MPA.



Means of awareness



Awareness is probably the best way to ensure a good management of the marine environment. The most appropriate methods in order to inform the public have to be looked for. It is essential to provide precise information on the marine environment and scuba diving in order to increase public awareness. The information provided can concern, for example, the sites of dives, the fauna and flora encountered, the scuba diving centers etc. This information can be the subject of a printed diving guide, a multimedia application, a web site, films on marine seabeds, etc. **These tools must increase public awareness and encourage diving activities that are respectful of the environment.** Besides, this communication can allow the marine seabed and natural resources of a region to be known abroad.

The whole of these tools (catalogue, film, web TV, education, etc.) **is also developed in the SUBMED project « strategy of sustainable development of sub-aquatic tourism in the Mediterranean sea» (INTERREG IIIB MEDOCC for the 2000/2006 period, especially in the 4.2 measure of the program dealing with the development sustainable tourism).** The SUBMED project aims to mobilize the local authorities, the actors of the tourism of littoral regions, and the actors of the diving activities in aid of a sustainable development of this activity in Mediterranee in order to structure an offer of high environmental quality in this activity and to bring scuba diving into ecotourism. This project emerged on the elaboration of a guide of good practice for the regions and their partners which prefigures a future ecolabelisation of this activity in the mediterranean region. Finally, this project promotes subaquatic tourism sustainable and respectful of the environment to the actual and future customers.

1 - Awareness of the non divers

To inform the public on environment themes is an efficient method to change the behaviours of the people. It is possible to consider education programs on environment and scuba diving in order for the non divers or futures divers to have good basic knowledge in this matter. This could lead them to adopt respectful diving practices, as well as to promote scuba diving to the local socio-economic actors. The problem of the seasonal characteristic of this activity and its impacts on marine communities can thus be reduced (Fanciulli et *al.*, 2006).

1.1 - Catalogue

Nowadays, diving centers are strongly lacking of communication supports. The implementation, at the territory scale, of a common leaflet valorises them. They thus become both actors of the environment and promoters of an educational and playful activity, and they must aim to make the public become interested. By apnea or scuba diving, the playful and educational aspects of diving can draw new members both young and older, as families or groups. The opening up of the public is one the crucial points of the strategy to develop in order to promote subaquatic activities that are sustainable and respectful of the environment.

This type of brochure shows the main diving zones, illustrated by colourful sub-marine photo-graphs précising the diversity of the sites of the region. The leaflet is produced using information provided by the diving centers.

It not only deals with the different characteristics of the diving sites, but also with the requirement to protect the various marine ecosystems and thus must include the protected areas and their regulation. The leaflet can be handed out free to the diving centers and during national and/or international specialized exhibitions or events (Toulon Provence Méditerranée, 2006).

Example of implementation of a leaflet:
- Communauté d'Agglomération Toulon Provence Méditerranée (France).

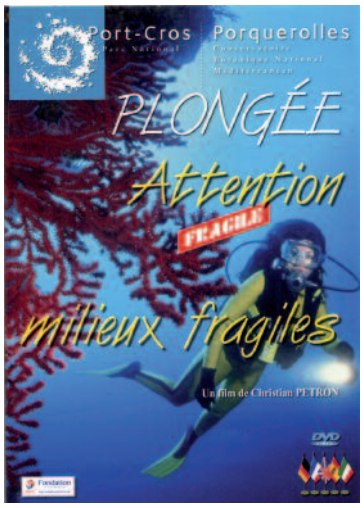
Avalaible documents:
- Catalogue of added value offers.




1.2 - Film

A promotion film prepared in collaboration with the various actors of the zone can present the MPA and the whole territory for which it depends. The more characteristic diving sites can be emphasized by underwater videos showing the biodiversity, the various biocenoses, the local flora and fauna.

The objective is to show the wealth of the MPA in order to get them known and to encourage the users of the MPA to protect it. **Thus, the Port-Cros (France) National Park made a film titled "careful, fragile environment" in order to present the good actions and behaviours to execute when the diver immerses.** The film is distributed to the regional diving centers and to the regional and national local authorities. It can also be sent out during exhibitions and large scale events (Neves et *al.*, 2006).



Examples of film implementation:
- Natural Marine Reserve of Cerbère-Banyuls (France),
- National Park of Port-Cros (France),
- Algarve Region (Portugal),

Available documents:
- Video tape and DVD of the Natural Marine Reserve of Cerbère-Banyuls,
- Video tape or DVD « dives, carefull fragile environement » National Park of Port-Cros,
- DVD on diving sites of the Algarve region.

1.3 - Web TV

It seems necessary to develop innovating communication tools bound for the general public in order to valoriue certain actions.

The creation of a Web TV allows to discover the richness of the subaquatic fauna and flora and to valoriue various realizations carried out in particular in the framework of the SUBMED program.

The Web TV (www.oceanica-tv.com) implemented thanks to the support of SUBMED program allows constantly to view films on diving and the marine world. Moreover, this Web TV will allow the diffusion of the demonstrations carried out within the framework of the SUBMED program. Launched in January 2006, it already knows a frank success and thus takes fully part in the valoriuation of the program (Toulon Provence Méditerranée, 2006).

Example of the implementation of a Web TV:
- Communauté d'Agglomération Toulon Provence Méditerranée (France).
- www.oceanica-tv.com (France)

Available documents:
- www.oceanica-tv.com




1.4 - Environmental Education of the public

The environmental education of the public is of primary importance. A very close attention must be paid to the young public (Parco Nazionalle delle Cinque Terre, 2006).

Some schools are the subject of a program of environmental awareness for the young people. **In order to promote an activity of diving respectful of the environment, an agent of the MPA or a diving instructor explains the marine environment and the fundamental rules of scuba diving and focuses especially on the measures to take in order to reduce the risks of disturbances.** At the end of the course, a small questionnaire can be distributed to the children to collect their views. The majority of the children generally grant much interest to this discovery. The answers reflect sometimes a certain environmental conscience of the children. They are very interested by diving as an leisure activity but they can express doubts about certain aspects, for example the possible dangers, the meetings with fauna (sharks) and their personal experience (Neves Dos Santos et *al.*, 2006).

Educational exhibitions can be organized in order to promote leisure diving as an ecological activity of tourism. They are initiatives aiming for the whole population but, in particular the children and the young people. They can comprise workshops on the various topics related to the sea (various fauna, flora, various activities such as fishing, etc). These exhibitions can be illustrated by underwater photographs and a contest of drawing for the children can be organized on marine topics (Neves Dos Santos et *al.*, 2006). Lastly, if the means allow it, the manager of the MPA can approach a diving center in order to organize "baptisms" of discovering and awareness.

Examples of implementation of environmental education:
- Natural Reserve of Lara Toxeftra (Cyprus),
- National Park of Mljet (Croatia),
- Natural Park of Acantilados Maro Cerro Gordo (Spain),
- Marine Reserve of Bahia de Palma (Spain),
- Natural Park of Cabo de Gatar Nijar (Spain),
- Natural Marine Reserve of Cabo de San Antonio (Spain),
- National Park of Cabrera Archipelagos (Spain),
- Natural Regional Park of Cap de Creus (Spain),
- Natural Park of El Estrecho (Spain),
- Marine Reserve of Freus d'Eivissa (Spain),
- Natural Park and Marine Reserve of Isla de Alboran (Spain),
- Marine Protected Area of Islas Medas (Spain),
- Marine Reserve of Migjorn de Mallorca (Spain),
- Marine Reserve of Norte de Menorca (Spain),
- Marine Fishing Reserve of Ses Negres (Spain),
- Natural Reserve of Bouches de Bonifacio (France),
- Natural Marine Reserve of Cerbère-Banyuls (France),
- Marine Park of la Côte Bleue (France),
- Marine National Park of Zakynthos (Greece),
- National Park of Archipelago di La Maddalena (Italy),
- Marine Protected Area of Asinara (Italy),
- Marine Protected Area of Capo Caccia - Isola Piana (Italy),
- Natural Marine Protected Area of Cinque Terre (Italy),
- Natural Marine Protected Area of Isole Egadi (Italy),
- Natural Marine Protected Area of Isole Tavolara - Punta Coda Cavallo (Italy),
- Marine Protected Area of Miramare (Italy),
- Marine Protected Area of Penisola del Sinis (Italy),
- Natural Marine Protected Area of Portofino (Italy),
- Natural Marine Protected Area of Punta Campanella (Italy),
- Marine Protected Area of Secche di Tor Paterno (Italy),
- Marine Protected Area of Torre Guaceto (Italy),
- Natural Reserve of Palm Island (Lebanon),
- Protected Area of de Fanar Ibn Hani (Syria),
- Protected Area of Om Al Toyour (Syria),
- Protected Area of Ras El Bassit (Syria).

Available documents:
- Files,
- Leaflets and brochures,
- Posters,
- DVD and tapes,
- Books,
- Educational toys.




1.5 -Environmental diving

Environmental diving allows everyone to discover the world of silence and privileges the discovery of the marine richness by general public to the detriment of the purely sporting performance.

The underwater video duplex is a system of video transmission in real time. The public can see, hear and dialogue live with an underwater diver carrying a camera and filming the seabed. The public attends the diving while having the possibility of asking the diver to zoom on a species, explain and comment on certain observations. Projection takes place in a room or outside on a giant screen. Adults as well as children are caught with the play and "walk on" at the pace of the diver underwater. Many are the spectators to express their desire to cross the step to learn how to dive. This system allows to transmit an audio and video hertzian signal at a distance of a maximum of ten kilometers (Toulon Provence Méditerranée, 2006).

This tool can be proposed to schools, school complexes, associations, local communities, and any organization interested within the framework of these activities.

The applications are multiple:
- Environmental education,
- scientific,
- discovery of the underwater world,
- tourism,
- factual.

Examples of implementation of environmental diving:
- GEOM Association (Groupe d'Etudes et d'Observations Méditerranéennes / group of mediterranean study and observation), Sanary-sur-Mer (France),
- Communauté d'Agglomération Toulon Provence Méditerranée (France),
- Marine Protected Area of Miramare (Italy).

Available Documents:
- Descriptive documents.

1.6 - Underwater path

The creation of an underwater path constitutes an excellent mean of bringing the inhabitants of an area and the tourists to discover the underwater world. **Trimmed with teaching supports, the underwater path is a mean of sensitizing in full safety a large audience, with or without a guide.** It allows the visitors provided with fins, mask and snorkel to discover the diversity of the marine life from the surface. It is a privileged tool for education of the eye, and for sensitizing to protect the fauna and flora diversity. **Both playful and educational, the creation of a discovery path of the underwater environment thus makes it possible to widen the offer of diving to the general public while limiting the over frequentation of the already existing sites.**

Several reasons explain the passion for this activity. Indeed, this teaching aid seems to answer:
- the need for developing educational actions dealing with the environment, the littoral and marine environments in particular,
- the development of the offer as regards to the underwater tourism due to the extraordinary attraction to the sea, the underwater world and the diving,
- the need to get back to nature.




The fundamental brake of the development of the underwater paths is often the constraining lawful framework, in particular as regards to responsibilities towards the concept "of encouraging people to swim" and thus of monitoring it. If the monitoring of a delimited zone is legitimate and easy to put in place within the framework of swimming on a beach, it becomes much more complicated, if not impossible to put in place within the framework of a webbed excursion, because of both the distances covered by the swimmers in fins mask and snorkel (PMT “fines, masques et tuba”) and of the topography of the coast used (rocky, sheered to observe fixed fauna and flora). In France, three types of rules are applicable today:

- Zone Reserved Only for Swimming (ZRUB, Zone Réservée Uniquement à la Baignade), which in fact prohibits the other uses (fishing, navigation), and implies the existence of a device of help,
- Area forbidden to Engine Boats (ZIEM, Zone Interdite aux Embarcations à Moteurs), which, on its own does not prevent the other uses,
- another solution rarely used but suggested by the Maritime Prefecture for the path of Embiez was an « Area forbidden to navigation and anchorage, delimited in the plan of communal beacons by the Maritime Prefect.

The ideal path could be established in a secured ZRUB, with an underwater installation and rescue station. Its protection could be possibly perpetuated by the creation of a quartering, first step towards the creation of a protected area. The operators of underwater paths would then be incited to create protected zones. This step would go contrary to the actual tendency where it is more often the managers of MPA who create such an educational tool (Mabile, 2002). However, Salles (2002) developed different scenarios and legal frameworks for the creation of underwater paths (Table 4).

	Hyphothesis	Objectives
Project 1	Localized in the 300 meters band from the limit of water	Discovery of the natural environment, without establishment of structures on the seabed
Project 2	Localized in the 300 meters band from the limit of water	Educational discovery of the environment with installation of information structures on the set up on seabed.
Project 3	Localized in the 300 meters band from the limit of water	Educational discovery of the environment with immersion of structures (artifical reefs type)
Project 4	Localized in the territorial sea, beyond the band of the 300 meters from the limit of water	Discovery of the natural environment, without establishment of structures on the seabed
Project 5	Localized in the territorial sea, beyond the band of the 300 meters from the limit of water	Educational discovery of the environment with installation of information structures on the set up on seabed.
Project 6	Localized in the territorial sea, beyond the band of the 300 meters from the limit of water	Educational discovery of the environment with immersion of structures (artificial reefs type)

Table 4 : Scenarios for the creation of underwater paths

Roughly, an underwater path is characterized by 4 fundamental elements (Mabile, 2002):
- watermarks securing the zone of activity,
- numbered buoys of stations,
- panels immersed under the buoys,
- the presence of guides - organizers.

The access to the underwater path can be done through a bridge of reception located on the beach. Instructors welcome the public and give them all the necessary information. If necessary, the fins, masks and snorkel as well as submersible leaflet on the marine fauna and flora can be rented. The access to the path being free, only the renting of the equipment can be charged.

Of a short length allowing the evolution in flippers, mask and snorkel, and limited by watermarks, the underwater path is punctuated by several observation stations representative of the ecosystems present on the site. Each station is marked out by a buoy numbered and equipped with immersed leaflets of information. Each buoy is provided with a handrail to facilitate the discovery of the underwater world in full safety. The perimeter of the path is supervised by swimming instructors during the opening hours.

In order to combine the pleasure of discovery with satisfaction of enriching the knowledge of the underwater world, the visit can be made with an instructor or a guide. **On some paths (Natural Marine Reserve of Cerbère-Banyuls), the visit is commented on using a FM Frequency Pro snorkel (Amphicom), which, provided with an active end, allows a hearing of a surprising quality by the bone conduction through the teeth. The marine environment and its inhabitants are thus introduced progressively along the path.**

The development of the offer of webbed excursion on a territory is carrying potentialities as regards to sustainable development of subaquatic tourism on a great number of plans:
- widening of the range with installation of a product accessible to the greatest number of people
- legibility of the offer near the major places of frequentation of the tourists, beaches,
- tool of awareness to the environment, especially for the young people,
- offers being able to be proposed to guides of experienced divers,
- facility of set up compared to the paths,
- playful character according to the tools used (teaching case, FM snorkel, submersible leaflets, etc).




This tool answering the vocation of welcoming the public, it seems essential to set up impact studies in order to better apprehend the influence of the frequentation of the underwater paths on the fauna and flora, even more if the path is created within a MPA. Various protocols and studies have thus been carried out (Ferrari and Planque, 2002; Musard and Poulain, 2002; Planque, 2002; Lenfant and Schrimm, 2005).

Examples of implementation of an underwater path:

- Natural Park of Cabrera Archipelagos (Spain),
- Natural Reserve of Bagnas (France),
- Natural Marine Reserve of Cerbère-Banyuls (France),
- Marine Park of la Côte Bleue (France),
- National Park of Port-Cros (France),
- Association of the Domaine du Rayol, Le Rayol-Canadel (France),
- Octopussy Association, Le Pradet (France),
- Blue workshop of Cap de l'Aigle, La Ciotat (France),
- Community of Toulon Provence Méditerranée Agglomeration (France),
- CPIE of Iles du Lerins and Pays d'Azur, Cannes (France),
- Marine National Park of Zakynthos (Greece ; 2 projects),
- Marine Protected Area of Cinque Terre (Italy),
- Natural Marine Protected Areae of Isole Tremiti (Italy),
- Marine Protected Area of Miramare (Italy),,

Available Documents:

- Technical documents,
- Awareness tools.

2 - Awareness of the divers

The proposal of tools that are both promoting diving and providing awareness, would allow the mobilization of the managers of the MPA, the local communities, the actors of tourism of the littoral areas, and the diving sector in favour of the sustainable development of this practice in the Mediterranean sea in order to structure an offer of high environmental quality in this field and to direct diving towards practices with an eco-tourism character.

2.1 - Descriptive submersible card, leaflet, educational case

Many diving sites in the world place identification cards of the species at the disposal of the divers to help them know the marine life. **To ensure a good environmental protection, the divers must have access to precise information on the living resources of the sea.** This is why the identification cards of the marine species are very important for the sustainable development of the activities of subaquatic tourism, considering **the information given to the public can contribute to create an environmental awareness.** The public can appropriate easily assimilated data where the richness of the underwater world is highlighted.

The design of such cards requires knowledge in the scientific field (identification, criteria important to be shown, etc), technical field (photographs, software for image processing, etc), artistic field (colours, forms, page set up, etc.) and education field.

In collaboration with the diving centers, information on the most common species are collected in order to make cards of identification of the most precise species depending on the sites. This information is supplemented by those provided by the scientific literature and studies on the flora and the fauna of the sea-bed. The principal groups (algae, vertebrate and invertebrate) are taken into account. After having chosen *taxa* to be shown on the identification cards, images are published by a professional and are adapted to the cards. These images must highlight the natural posture, the exact colours, the identifying information and the totality of the body of the specimen. In general, the classification of the species is carried out according to the flora and fauna groups (algae, sponges, cnidaires, molluscs, fish, etc), even if logical adaptations (for example bryozoaires and sponges) are possible since this work is addressed to a public without a biology background. Nevertheless, other fittings can be considered according to the colors, the forms, the environment, the facility of observation, etc. Moreover, other non-aquatic species (plants, birds, "leashes of sea", etc.) can sometimes be included in order to provide a global view and knowledge of the coastal environment. On the identification cards which show the photographs of each group, the general name and the scientific name are indicated. Finally, several cards can be created.

These submersible descriptive cards are distributed to the diving centers, to the regional, national and local authorities, and to the travel agencies, etc. They are usable both under water by the divers and on the ground by organizers, tourists, and children. Divers




prefer multi-pages guides. The double sided card is adapted to the underwater paths since it is easier to use by children (De Vaugelas and Trastour, 2002).

In addition to these cards, leaflets or booklets preaching the respect of the environment and advising the divers on good practices to adopt can be published (the Ten Commandments of the good diver, Natural Marine Reserve of Cerbère-Banyuls).

An educational case can also be designed in order to gather these various supports to answer expectations and at the level of everybody.

Examples of implementation of descriptive submersible cards, leaflet, educational case:

- Natural Reserve of Lara Toxeftra (Cyprus),
- National Park of Mljet (Croatia),
- Natural Park of Acantilados Maro Cerro Gordo (Spain),
- Marine Reserve of Bahia de Palma (Spain),
- Natural Park of Cabo de Gatar Nijar (Spain),
- Natural Marine Reserve of Cabo de San Antonio (Spain),
- Regional Naturel Park of Cap de Creus (Spain),
- Natural Park de El Estrecho (Spain),
- Marine Reserve of Freus d'Eivissa (Spain),
- Natural Park and Marine Reserve of Isla de Alboran (Spain),
- Marine Protected Area of Islas Medas (Spain),
- Marine Reserve of Migjorn de Mallorca (Spain),
- Marine Reserve of Norte de Menorca (Spain),
- Marine Fishing Reserve of de Ses Negres (Spain),
- Natural Reserve of Bouches de Bonifacio (France),
- Natural Marine Reserve of Cerbère-Banyuls (France),
- Marine Park of la Côte Bleue (France),
- National Park of Archipelago di La Maddalena (Italy),
- Marine Protected Area of Asinara (Italy),
- Marine Protected Area of Capo Caccia - Isola Piana (Italy),
- Natural Marine Protected Area of Cinque Terre (Italy),
- Natural Marine Protected Area of Isole Egadi (Italy),
- Natural Marine Protected Area of Isole Tavolara - Punta Coda Cavallo (Italy),
- Marine Protected Area of Miramare (Italy),
- Marine Protected Area of Penisola del Sinis (Italy),
- Natural Marine Protected Area of Portofino (Italie),
- Natural Marine Protected Area of Punta Campanella (Italy),
- Marine Protected Area of Secche di Tor Paterno (Italy),
- Marine Protected Area of Torre Guaceto (Italy),
- Natural Reserve of Palm Island (Lebanon),
- Protected Area of Larvotto (Monaco),
- Protected Area of Fanar Ibn Hani (Syria),
- Protected Area of Om Al Toyour (Syria),
- Protected Area of Ras El Bassit (Syria),
- Specially Protected Area of Kekova (Turkey).

Available Documents:

- cards,
- leaflets,
- educational cases.

2.2 - Environmental Training course

Awareness of the divers towards behaviours more respectful of the environment (prohibition of feeding the fish, stabilization of the divers and attention paid to the movements of the flippers, prohibition of collecting species or displacing stones, recovery of macro waste found on the bottom, etc.) must be encouraged by the managers of MPA and must be carried out in collaboration with the diving centers, in particular at the time of training.

At present, awareness within the diving centers is often non formal and few precise supports exist (charter of Longitude 181 Nature, tools of PADI AWARE, etc). The submersible cards of biological recognition are highly diffused but are not supports for awareness of the need for environmental protection. **The training or the practice of the diving are rarely used in order to sensitize the public with the marine environment, its stakes and its problems** ("black/oil tides", protection of Cetacea, progression of Caulerpa, interest of protected spaces, etc). Despite the constraints, awareness could be developed, as well as an incentive to more responsible behaviors in autonomous diving or apnea (spear fishing, underwater archaeology, etc).

Beyond the tools, **the deep change of the behaviour of the dives involves the instructors, the persons in charge of diving centers and the managers of MPA**. It must obviously take effect during the dive but it starts well upstream and continues after the dive on the boat and in the buildings of the center. Basically, using the tools provided by the managers of MPA, this approach starts with the persons in charge, involves the instructors, and then depends on the public of divers, from the experienced diver to the apprentice, and from the scuba diver and the apnea diver.

The difficulty of the approach of homogenization of the practices as regards awareness of the environment is due to the fact the instructors use rather different teaching methods than can even be opposite. The card of the environment can still be played even if the maturity of the teaching systems towards awareness of the environment, in the courses of managers training or specialization modules of the pupils, remains very unequal. However, awareness of the environment and its stronger valorisation in the training of the diving, lead these various actors to plan to speak out with the same voice.

A module of awareness of the environment which could be common to all the teaching systems is an extremely interesting tool. According to the levels of practice (child, webbed hiker and apnea diver, beginner diver, autonomous diver, instructor, diving center), this teaching is based on the actions to carry out in order to respect and know the environment better:

- Know the environment,
- Decrease the impact on the environment,
- Protect and act to preserve.

Examples of implementation of an environmental training course:

- Natural Reserve of Lara Toxeftra (Cyprus),
- Marine Protected Area of Islas Medas (Spain),
- Communauté d'Agglomération Toulon Provence Méditerranée (France),
- Association Longitude 181 (France),
- Federations and training agency of scuba diving (FFESSM, CMAS, SSI, PADI, ANMP, etc.)

Avalaible Documents:

- Teaching supports.

2.3 - Campaigns of seabed cleaning

The Mediterranean coasts are the subject of many anthropic activities such as commercial fishing and leisure fishing, deep-sea diving, sailing, etc. Moreover, these zones are very important from the ecological and biological point of view because they shelter many fragile and threatened species. The divers are then the first witnesses of the various aggressions and damages.

Considering the ecological importance and with an aim of improving the beauty of the underwater landscape, cleaning campaigns of the most attended sites diving are possible and develop more and more. This initiative requires the implication of the local authorities and the diving centers. Groups of amateur divers can be invited to collect non-natural waste and other products, and to think about their source, the time needed for their degradation, and their recycling. The divers would then notice that it is much more pleasant to dive in a clean environment. **This type of initiative encourages the "responsible" diving activities** (Neves et *al.*, 2006).

Sometimes, the divers are asked to take part in the follow-up of the progression of invasive species such as *Caulerpa taxifolia* in the Marine Port-Cros National Park.

Example of implementation of seabed cleaning campaigns:
- Marine National Park of Port-Cros (France),
- Marine National Park of Zakynthos (Greece).

2.4 - Multimedia valorisation of diving sites

Diving being basically an activity of discovery and observation of a world invisible from the surface and of discovery carried out in a state of weightlessness, a tool of 3D real time presentation of the subaquatic world using virtual reality and new communication and information technologies can be developed. Like the representations of the ski resort tracks, an interactive tool of **reproduction of sea-beds in 3D real time images, intended to promote the sites of diving of the territory, their topographic characteristics, the animal and plant species present as well as the main paths of exploration** can be created. The goal is to reproduce the most accurately possible the sites of diving. For that purpose, three main stages are necessary:

- after selection of the sites with the diving centers, a precise reading of the bathymetric data is carried out using a ship provided with a multibeam echosounder.
- from these data, topographic modeling is then carried out using an evolutionary grid allowing the representation of virtual seabed by successive approaches. In each site, priority zones for the representation according to their state, ecological richness or development constraints, are selected
- based on this, it then remains to equip the seabed according to the species present. The diving centers are associated at this stage to provide data on the settlements (fauna and flora) on each site.

The result presented is extremely interesting. It indeed allows the user to evolve in the sites of diving as one evolves in an interactive video game. Thanks to the presence of windows, **it is possible to learn how to recognize the various alive species on the site.** The paths presented allow the instructors from the diving centers to prepare diving according to the depths and distances covered and the anchorage used.

The prospects for such a tool are numerous. Integrated into the website of the MPA, of the diving centers, of the communities, etc, this software allows to present the symbolic sites of diving of the territory, to show the evolution of the fauna and the flora in real time and to **sensitize the public with the marine environment** (Toulon Provence Méditerranée, 2006).

Finally, **submersible supports can be proposed**, not fearing neither the spindrift, nor the pressure.

They consist of several double sided pages, presenting the diving sites, with in relief sight of the topography of the site, proposal for a path, recommendations and advices, GPS localization, photographs of the characteristic biocenoses, awareness to the marine environment and to a respectful diving.

Implementation of multimedia valorization of diving sites:
- Communauté d'Agglomération Toulon Provence Méditerranée (France),
- Islands of the west of Marseille (France),
- Islands of the east of Marseille (France),
- Islands of Port-Cros and Porquerolles (France),
- La Ciotat Bay (France).

Available Documents:
- Submersible guides.

Measures of scuba diving management in the MPA

1 - New diving sites

The **discovery of new sites could diversify the offer and, probably reduce the impact on the present sites** (Manca and Palmisani, 2006). An investigation of the most interesting scuba diving sites can be undertaken in order to distribute the scuba diver flow on several places. The scuba divers preferring usually rocky substrates, a special attention is put on this substrate type (prospecting and studying scuba diving, use of sidescan sonar, etc). **However, is this a sustainable solution "to sacrifice" a site to preserve another one? Each manager will have to appreciate the consequences of the choice.**

To optimise the research efforts of the new scuba diving sites, the diving centres can be put at contribution.
A questionnaire including questions concerning the knowledge of potential zones of scuba diving and the localization of these new rocky bottoms is distributed (Neves et *al.*, 2006).

Within the Marine National Park of Zakynthos (Greece), the manager anticipates to create a zone dedicated to scuba diving and having a load capacity from approximately 30 to 40, 000 scuba divers/year.

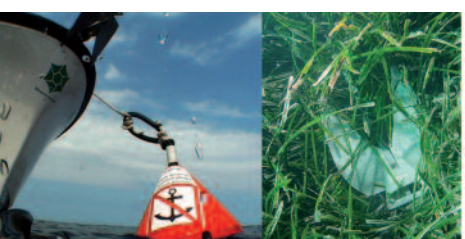
2 - Infrastructures set up

2.1 - Installation of organized mooring places

The development of scuba diving can generate various marine environment degradations, caused by the scuba divers and the anchor of their boats (Ruiz ; Hawkings and Roberts, 1992 ; Chadwick-Furman, 1997; Bavestrello et *al.*, 1998 ; Francour and Koukouras, 2000 ; Francisco Gallo et *al.*, 2001 ; Tissot et *al.*, 2004). This last factor can be partly or completely removed by some installations.

The installation of organized mooring places in the most scuba diving attended areas and the most vulnerable sites is an objective largely shared by the MPA managers and the diving centres. There are several reasons:

- **Environmental;** the repeated dropping of anchor on the sites causes degradations,
- **Safety:** on some sites, the current and the wind can obstruct or even stop the boat from dropping the anchor or dropping it in a safe way near the scuba diving site. It is particularly the case during “baptism” or training diving. Then, in the sectors that are very attended by the tourist boats, a surface buoy can materialize the existence of a scuba diving site, accustom the users to the scuba divers presence on this site, and thus make evolve their practice (speed moderation, etc.),
- A **more practical scuba diving organization** for the professionals: the need to drop the anchor on the bottom obliges on some sites (deep wreck) to send a monitor, which "sacrifices" its scuba diving only to this purpose. Buoys on the most attended sites would largely facilitate the centres activity,
- the act of dropping the anchor is a **preliminary condition to any later action of frequentation** management (good control code, scuba diving official journal, limitation of the scuba divers number, separation of the activities, etc).



However this device does not avoid the scuba divers direct effects during their immersion.

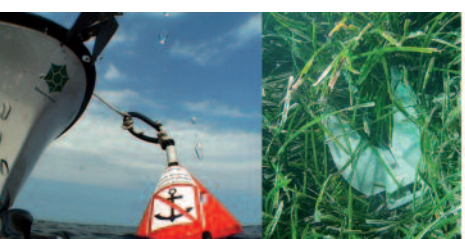
The installation of an organized place to drop the anchor (mooring places) can not be done without a preliminary phase of information, dialogue and meeting with all the users. In addition, if places to drop the anchor are firstly reserved for the scuba diving boats, it is necessary to encourage a respectful behaviour of the users for a reasoned and concerted use of these mooring places. Different colour buoys can be installed in order to distinguish their priority users (professional scuba divers structures, private scuba divers, yachtsmen, etc). **Teaching documents must accompany this type of installation :**

- a **charter of use of the mooring places** in which the users commit themselves to adopt responsible ecological behaviours,
- a special leaflet (**"mooring guide"**) explaining to the users the interest of such an installation, presenting the devices and giving good use instructions.

The choice of the better solution is made according to the will to generate the lowest possible impact on the environment, in particular on the *Posidonia oceanica* and corals bottoms. According to the bottom nature, sites depth and the ecosystems sensitivity, there are various systems being able to be or not to be materialized on the surfaces or subsurface by a buoy. **Within the MedPAN framework, a management tool that synthesizes several permanent ecological places to drop an anchor has been developed (Francour P. et *al.*, 2006).**

For all the developed solutions and whatever the ground nature, the anchor does not rest anymore on the bottom.

Finally, if these mooring systems installation is impossible, it is primordial to make the users sensitive to the problem so that they drop the anchor preferentially on the movable bottoms such as sand.



Examples of organized installation of mooring places:

- Natural Park of Acantilados Maro Cerro Gordo (Spain),
- Natural Park of Cabo de Gatar Nijar (Spain),
- Natural Marine Reserve of Cabo de San Antonio (Spain),
- Regional Natural Park of Cap de Creus (Spain),
- Natural Park of El Estrecho (Spain),
- Marine Reserve of Illa del Toro (Spain),
- Marine Reserve of Illes Malgrats (Spain),
- Natural Park and Marine Reserve of de Alboran (Spain),
- Marine Reserve of Islas Columbretes (Spain),
- Fishing Natural Reserve of Ses Negres (Spain),
- Natural Reserve of Tabarca (Spain),
- Natural Reserve of Bagnas (France),
- Natural Reserve of Bouches de Bonifacio (France),
- Marine Natural Reserve of Cerbère-Banyuls (France),
- National Park of Port-Cros (France),
- Comunity of Toulon Provence Méditerranée Agglomeration (France),
- Marine National Park of Zakynthos (Greece),
- National Park of Archipelago di La Maddalena (Italy),
- Marine Protected Area of Capo Carbonara (Italy),
- Protected Natural Marine Area of Capo Gallo (Italy),
- Protected Natural Marine Area of Cinque Terre (Italy),
- Protected Natural Marine Area of Isole Egadi (Italy),
- Protected Natural Marine Area of Isole Tavolara - Punta Coda Cavallo (Italy),
- Marine Protected Area of Del Sinis (Italy),
- Protected Natural Marine Area ofPortofino (Italy),
- Protected Natural Marine Area of Punta Campanella (Italy),
- Marine Protected Area of Secche di Tor Paterno (Italy),
- Marine Protected Area of Torre Guaceto (Italy),
- Specially Protected Area of Kekova (Italy).

Available documents:

- Descriptive leaflets,
- Regulation.

REGLEMENT DE POLICE

L'utilisation de la zone de mouillage est réglementée par un arrêté du Préfet Maritime et par un réglement de police affichés dans les capitaineries de la côte.

Voici les principales règles à respecter

Article 1 :
Dans la zone de mouillage (carte au verso) le mouillage des bateaux n'est autorisé que sur les dispositifs d'amarrage tels que définis à l'article 2.
Si tous les dispositifs d'amarrage sont occupés, le mouillage sur ancre peut être toléré uniquement dans les situations exceptionnelles suivantes :
- conditions météorologiques idéales (vent inférieur à force 5 = 20 nœuds au sémaphore de Béar) expliquant la forte affluence des navires sur la zone
- nombre de mouillages abrités insuffisants pour accueillir tous les navires

Article 2 :
L'accès aux dispositifs d'amarrage est autorisé :
- aux navires support de plongée des centres ou associations subaquatiques soumis aux dispositions de la loi n° 84-610 du 16 juillet 1984 modifiée, relative à l'organisation et à la promotion des activités physiques et sportives, qui doivent s'amarrer sur les bouées numérotées de 1 à 11 de couleur rouge.
- aux navires de plaisance de passage, d'une taille maximale de 20 m hors tout, qui doivent s'amarrer sur les bouées numérotées de 12 à 15 de couleur blanche.

Article 3 :
La vitesse maximale des navires dans les limites de la zone de mouillage est fixée à 3 nœuds.
Sauf cas de force majeure, les navires ne peuvent se déplacer à l'intérieur de la zone que pour entrer, sortir ou changer de mouillage.

Article 4 :
Tout navire amarré dans la zone de mouillage est sous la responsabilité de son propriétaire. A tout moment, le capitaine doit être en mesure d'effectuer toute manœuvre qui lui est demandée par le gestionnaire ou son représentant.

Article 5 :
Aucun poste ne pourra être attribué d'une manière privative et définitive à un navire support de plongée ou de passage. A fortiori, aucun propriétaire ne peut revendiquer la propriété du poste occupé par lui.
L'occupation d'un dispositif d'amarrage se limite à une durée de 3 heures. Au delà, le navire doit libérer la place si un autre navire lui demande. Entre le coucher et le lever du soleil, seule la pratique de la plongée sous-marine justifie l'occupation d'un dispositif de mouillage en respectant le délai ci-dessus.
Pour chaque dispositif d'amarrage, la force de traction liée à l'amarrage des navires ne doit pas dépasser un tonnage maximum de 40 tonneaux.

...

Article 15 :
La réserve assure la gestion des dispositifs de mouillage mais n'attribue pas les postes dans la mesure où il n'y a pas de problème entre les différents acteurs. Les propriétaires des bateaux choisissent eux-mêmes, au jour le jour et en fonction des places disponibles, le dispositif sur lequel ils veulent s'amarrer conformément aux articles 1, 2 et 5 du présent règlement.

...

La mise en place des dispositifs d'amarrage a été financée par le Conseil Général des Pyrénées-Orientales, le Ministère de l'Ecologie et du Développement Durable et l'Union Européenne

Merci de signaler à la Réserve Naturelle Marine toute anomalie ou usure sur les dispositifs d'amarrage (04.68.88.09.11)

CONSEIL GÉNÉRAL

Réserve Naturelle CERBERE-BANYULS

Zone de Mouillages Organisés du CAP L'ABEILLE

GUIDE PRATIQUE D'AMARRAGE

Ensemble, préservons l'environnement

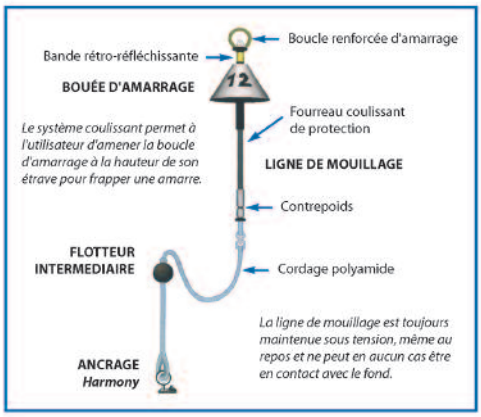
CONSIGNES D'AMARRAGE

MANOEUVRE D'APPROCHE

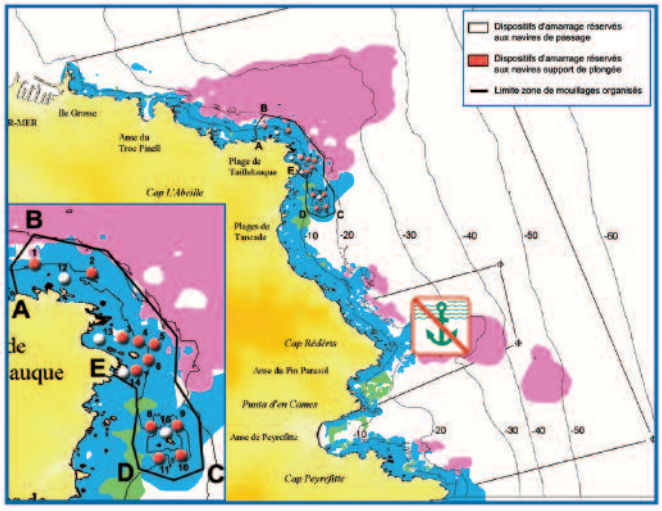
- Orientez vous face au vent ou à contre-courant pour ne pas endommager la bouée.
- Approchez vous de la bouée lentement et avec précaution, notamment si les navires déjà amarrés signalent une activité de plongée (pavillon Alpha).

MANOEUVRE D'AMARRAGE

- Saisir l'anneau et s'amarrer directement dessus. Il est la continuité de la ligne de mouillage qui traverse la bouée : celle-ci ne subissant pas ainsi les efforts de l'amarrage.
- Amarrez vous au plus court afin de limiter la zone d'évitage des embarcations.



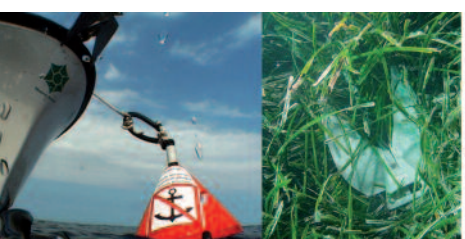
La Réserve Naturelle Marine de Cerbère-Banyuls a été créée en 1974 dans un but de préserver le patrimoine naturel de la côte rocheuse. Depuis 1977, le Conseil Général en assure sa gestion en essayant de concilier la protection des fonds marins et la préservation des activités socio-économiques. La mise en place d'une zone de mouillages organisés s'inscrit dans cette politique.



QUELQUES CONSEILS :

- Vérifiez que votre amarre est correctement attachée à la bouée.
- Agissez avec courtoisie pour prendre et quitter un dispositif d'amarrage (vitesse limitée à 3 noeuds).
- Respectez la faune et la flore sous-marines ainsi que leur habitat.
- Ne jetez rien par dessus bord.

Ces dispositifs d'amarrage évitent la destruction des fonds due au mouillage direct des ancres. Professionnels de la mer et plaisanciers, nous vous encourageons à les utiliser pour la préservation de l'éco-système.



2.2 - Installation of landscape artificial reefs

In the Mediterranean sea, the shipwrecks are the principal artificial attraction sites for scuba diving tourism. Because of its tormented history, and to face the competition of warm, clearer and full of fish water of the Red Sea, the Mediterranean sea has until now developed a lot (too much) this inheritance of shipwrecks on its littoral. Today, the source disappears and when wrecks exist at accessible depths, they are often very attended and in an advanced state of degradation (Pioch; Ruitton et *al.*, 2004). If the immersion of new wrecks is a recurring request of the scuba diving centers (Manca and Palmisani, 2006), the work about this kind of project is now impossible due to the Barcelona convention.

The creation of other scuba sites, less fragile, more accessible, and in particular less deep, seems essential. **These sites are used at the same time for the training on scuba diving techniques, but also for ecological education** (Dalias, 2005).

The reefs developed for halieutic fishing (artisanal fishing) proved, in an incidental way, wonderful poles of attraction for the scuba divers (Charbonnel; Jouvenel and Plantard, 2005).

The immersion of a landscape artificial reef would allow:

- the **fixing and valorization of the marine natural** fauna and flora resources of the site,
- the **creation of a landscape presenting attractive qualities** likely to give desire to scuba diving centers for practising training sessions as much on this site, if not more, than on others,
- **Relief the too attended sites** of MPA,
- **No concurrence with fishing activity** in the way to avoid conflict of use.

The choice of the site must be done in dialogue with all the social and economic actors of the region.

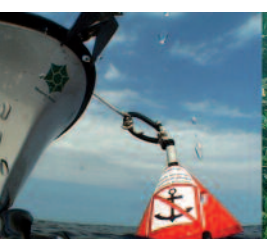
Firstly, an environmental impact study will be carried out on the immersion zone including a biocenoses and current study. The chosen zone for immersion of the reefs can be restricted. The reef structure which is established will have to allow to create several cohabited halieutic performances with the development of a scuba diving leisure activity. This reef will take part in the creation of a true underwater landscape by supporting a chosen fauna and flora development on a zone in becoming. A scientific follow-up of this site will have to be carried out. Lastly, the structure extraction will have to be envisaged if the environmental impact of this reef installation is not good (Toulon Provence Méditerranée, 2006).

Examples of landscape artificial reefs installation:

- Communauté d'Agglomération Toulon Provence Méditerranée (France).

Available documents:

- Regulation.





2.3 - Need for a scientific follow-up

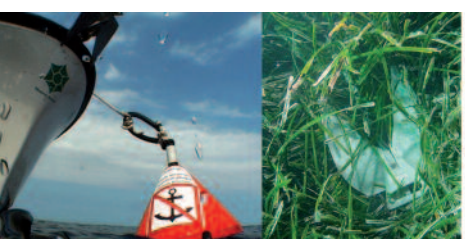
The whole of the sites management measures (organized mooring place, underwater paths, artificial reefs, etc.) must be the subject of a scientific follow-up (Blouet et *al.*, 2006; Bonhomme et *al.*, 2006).

The objective is to evaluate the impact of these measures in order to study their possibilities of extension and their transferable character. **However, this follow-up must be considered in the long term, and the problem of perpetuation is particularly crucial.**

In parallel, the scientific follow-up is a unique opportunity to create a bond between scientists and scuba divers, and consequently to enrich the scuba diving product in a sustainable development prospect: make the people more aware of the marine environment, participation of the leisure scuba diving in research, etc. The follow-up proves to be important, in different ways, to measure the scuba diving impact on the local environment, also to sensitive and to associate the scuba divers to the questions of observation, protection and comprehension of the environment.

The first taken measures consists in establishing a state zero of the biocenoses, an environmental follow-up being then led on the basis of this state zero.

The objectives assigned to these measures are the evaluation of the recolonisation of the developed zones as well as the measure of the users' impact by taking into account the settlements of various zones according to their accessibility for the scuba divers.



3 - Code of good practice for diving

The codes of good practice are written following observations or studies on the scuba diving and its impact and are often accompanied by a follow-up making it possible to analyze the positive effects or the encountered problems.

The codes of good practice are contractual tools which can have an important educational dimension, translating awareness on the questions related to the environmental protection and being able to have different objectives. There exists:

- **unilateral codes of good practice** characterized by the absence of legal force. Only one part is involved and no sanction is envisaged in the case of non respect. These official diving journals are generally taken on the initiative of users or professionals groups (Longitude 181),
- **multilateral codes of good practice** requiring the involvement of the managers and users of the environment, especially some professional scuba divers. They are the fruit of long discussions (Natural Reserve of Bouches de Bonifacio, Natural Marine Reserve of Cerbère-Banyuls, National Park of Port Cros, Naturel and Environment Defense Association of Agde countries ADENA).

Two codes of good practices are in project (the Green Island and Mugel, bay of Ciotat; Natural Park of Cap de Creus).

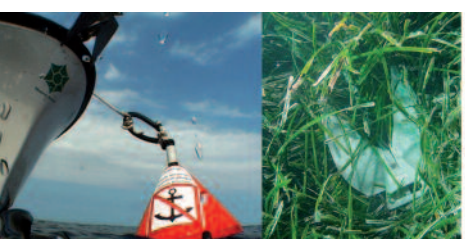
This partnership of code of good practices allowed the release of good practices contributing to the management of the site. It does not open right to financial counterparts and applies only because the scuba diving is carried out on a fragile site. **The voluntary step lies more in the awareness of the tourism operators of the fragile nature of the environment, aware of the fact that the preservation of the nature contributes to the sustainability of its activity, than in a label granting uses for commercial purposes** (this remains marginal and, is actually prohibited in the case of a natural reserve site).

3.1 - The partnership

The signatories of the codes of good practices are in general the manager of the Marine Protected Area which sets up the codes and the person in charge of a scuba diving centre as well as the private scuba diver who comes on the area concerned by the codes. The private scuba diver is not systematically concerned with the official diving journal. This is perhaps due to the fact that his presence on the sites is more is more specific than that of the professional centers or associative clubs, but also because he represents a more diffuse public and is consequently more difficult to target.

Currently, the signature of the codes of good practices remains the proof of a voluntary engagement on the level of the existing regulation observance, the respect of the environment and the awareness of public. **Only the signature of the codes of good practice of the National Park of Port-Cros is mandatory in order to be authorized to reach the sites.**

The engagement time is variable but remains rather short, maybe not to force the signatories and to allow changes in the contents of the codes according to the local context and the remarks, suggestions of the various users.



3.2 - Engagements of the signatories

The codes of good practices depend on a partnership. Thus **each signatory has engagements in order to optimize the primary aspect of this one, to manage the scuba diving activity and to minimize its impacts.**

Any signatory commits himself to respect:

- the regulation acting on the zone where the scuba diving is practised,
- the information of the code of good practices and to make it be respected,
- the environment particularly by prohibiting the feeding of the fish and the voluntary or involuntary contact with the species or the substrate. For that, it is recommended that the scuba divers have a good ballasting, balancing and not a damaging flippers' movement.

On this subject, there are different points from one code of good practices to another but the goal is common; to respect the biological environment during the diving.

The principal other recommendations are:

- to limit the illuminations use,
- to proscribe the use of underwater scooter,
- not to change the bottom structure,
- to take nothing,
- to avoid the harmful effects of sound,
- training courses and baptisms on the less fragile sites.

The persons in charge of scuba diving center engage themself in the same time to educate the users with the beauty and the brittleness of the sites through an environmental awareness often guided by supports provided by the MPA managers.

The persons in charge also commit themselves by preferentially using the mooring buoys of the sites and when that is not possible to anchor on the movable substrates rather than on the coral reef for example.

Lastly, if a follow-up of the activity is carried out, **it can be requested from the scuba diving centres to return an assessment on the occupation and the frequentation of the sites to the person in charge of the Marine Protected Area.** Moreover, the set up of a code of good practices would allow to institute an annual meeting of exchange, dialogue, information and common decisions.

3.3 - Counter parts brought by the manager

The label

The person in charge of the MPA often grants a label to the co-signatory respectful of the code. This label is the same as a law for his engagement and can be presented in the form of a panel, poster, flag, etc.
It can constitute a benefice on the customers eyes.
Labels and codes of good practices have as an interest to:
- qualify and structure an offer,
- make it readable by the visitor,
- facilitate the setting in the market,
- create a dynamic within the actors engaged in the approach.

However, it is necessary to keep in mind that the code allows the release of good practices contributing to the site management and applies by the only fact that the scuba diving is carried out on a fragile site. The voluntary step lies more in the awareness of the scuba divers of the fragile nature of the environment, aware of the fact that the preservation of the nature contributes to the sustainability of its activity, than in a label granting uses for commercial purposes whom uses remain limited (according to each PMS regulation).

The listening

The manager can associate the signatories to the dialogues on the organization and the scuba diving follow-up (National Park of Port-Cros).
Thus, few annual meetings are organized so that each partner is truly involved and the claims of each one are heard (Marine Natural Reserve of Cerbère-Banyuls). They make it possible to discuss again on the points that do not correspond to everyone's expectations, but also to improve and enrich the codes of good practices.
The engagement of the persons in charge of professional structures or the private individuals is often put in discussion during this meeting.

Common missions

The partnership which is established through the code of good practices, supports the joint actions and thus allows a better activity management.
Thus, at Port-Cros, some missions are organized with the local scuba divers in order to detect the presence of *Caulerpa taxifolia*.

The awareness

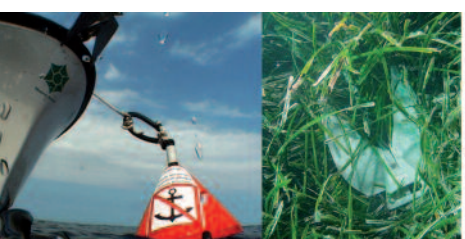
The Marine Protected Area is generally committed to set up campaigns of environment awareness and to help (National Park of Port-Cros and Natural Reserve of the Bouches de Bonifacio) or to realize (Marine Natural Reserve of Cerbère-Banyuls) some supports for the discovery and the promotion of underwater biology.
To make people aware of the marine biology and environment is based on many supports (books, video, descriptive cards, posters, etc.) being able to be gathered within an educational case (Marine Natural Reserve of Cerbère-Banyuls, National Park of Port-Cros).

The installation of organized mooring places

The code of good practices can allow the installation, the development and the management of organized mooring places (National Park of Port-Cros, Marine Natural Reserve of Cerbère -Banyuls, Natural Reserve of the Bouches de Bonifacio).

Examples of codes of good practices:
- Natural Reserve of Bagnas (France),
- Natural Reserve of Bouches de Bonifacio (France),
- Marine Natural Reserve of Cerbère-Banyuls (France),
- National Park of Port-Cros (France),
- Longitude 181 Association (France).

Available document:
- Codes of good practices.



4 - The scuba diving licence

The scuba diving licence makes it possible to control the sites access and is done with the organization managing the Marine Protected Area (department, region, etc). Some documents (identity card copy, the diving level, an insurance, etc.) are required to get it. A non autonomous scuba diver will have to be accompanied by a scuba diving guide who can take a maximum of 4 scuba divers with him.

According to the case, a maximum number of delivered licences is fixed and makes it possible to manage the frequentation by determining the maximum scuba divers number (4 boats or 40 scuba divers per day in the National park of Cabrera Archipelagos; 50 licences per day in the Marine Reserve of Tabarca). This limitation can also appear in the code of good practices (Natural Park of Port-Cros) or in the regulation (Marine Protected Area of Islas Medas, Marine Protected Area of Portofino). The limitation is still rare but it is a point which appears essential to the managers. **However the request is important and these quotas are managed in a rather flexible way by considering that the request varies according to the season and the weather conditions.**

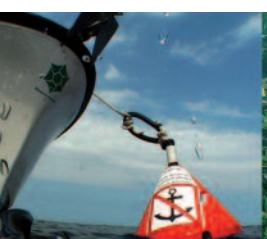
For the organized mooring places, the persons in charge of the MPA attribute each buoy to each centre and this according to the weather conditions.

The centres authorized to carry on their activity are characterized by the presence of a sticker on the boat.

Finally, **the scuba diving licence can be accompanied by a tax that is used for the installation and the development of new management actions within the Marine Protected Area** (National Park of Brijuni, National Park of Kornati, Marine Protected Area of Islas Medas, Natural Marine Protected Area of Punta Campanella). This tax rises at 3,5 Euros in the Marine Protected Area of Islas Medas.

Diving licence Installation:
- National Park of Brijuni (Croatia),
- National Park of Kornati (Croatia),
- Marine Reserve of Cabo de Palos Islas Hormigas (Spain),
- National Park of Cabrera Archipelagos (Spain),
- Natural Park of El Estrecho,
- Marine reserve of Islas Columbretes (Spain),
- Marine Protected Area of Islas Medas (Spain),
- Marine Reserve of Masia Blanca (Spain),
- Marine Reserve of Tabarca (Spain),
- Natural Reserve of Bouches de Bonifacio (France),
- Marine Protected Area of Capo Carbonara (Italy),
- Natural Marine Protected Area of Cinque Terre (Italy),
- Marine Protected Area of Isole Ciclopi (Italy),
- Natural Marine Protected Area of Portofino (Italy),
- Natural Marine Protected Area of Punta Campanella (Italy).

Available Documents:
- Diving licence,
- Regulation.





5 - The scuba diving regulation in the MPA

The majority of the MPA founded a regulation enabling them to manage the various activities present on their sites. For some, scuba diving was not taken into account because this activity is probably not the most important.

Sometimes, this "taking into account" absence depends on the considered management policy and the means available to carry it out. For the others, scuba diving can be regulated and this on variable levels (authorized scuba diving, specific regulation, strict prohibition).

In some zones (Marine C zone, sanctuary zone), the majority of the activities are authorized. But these sites are rare. Indeed, the MPA having for first objective the environment protection, they rarely authorize all the uses.

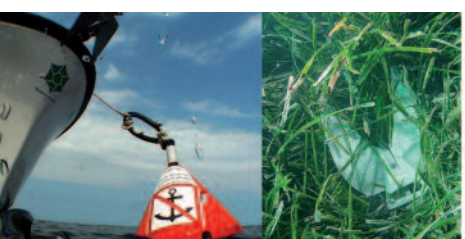
Consequently, in some places (buffer zone, general zone, marine B and C zones, Protected Area, zone of restricted uses, marine zone 2, peripheral zone), the activities are limited or regulated. Despite everything, in the majority of these sites, the scuba diving is authorized.

But in some zones (central zone, Integral, strictly protected area, maximum protection zone, marine zone 1, marine zone A) which correspond to the maximum protection, the majority of the activities are prohibited. Indeed, these sites are generally used to preserve a part of the Marine Protected Area without anthropic impact (Manca and Palmisani, 2006).

Around this regulation, various tools can be grafted allowing to manage the scuba diving with more or less flexibility (awareness of the environment, codes of good practices, diving licence, installations of the scuba diving sites, etc). The correct operation of this management type obviously depends on the behavior and the wish to act of the partners.

Examples of a regulation installation:

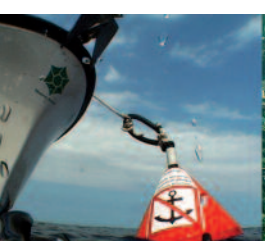
- Natural Reserve of Lara Toxeftra (Cyprus),
- National Park of Brijuni (Croatia),
- National Park of Kornati (Croatia),
- Special Marine Reserve of Malostonski Zaljev (Croatia),
- National Park of Mljet (Croatia),
- National Park ofTelascica (Croatia),
- Marine Reserve of Bahia de Palma (Spain),
- Marine Reserve of Cabo de Palos Islas Hormigas (Spain),
- Marine Natural Reserve of Cabo de San Antonio (Spain),
- National Park of Cabrera Archipelagos (Spain),
- Natural Regional Park of Cap de Creus (Spain),
- Natural Park of El Estrecho (Spain),
- Marine Reserve of de Freus d'Eivissa (Spain),
- Marine Reserve of Illa del Toro (Spain),
- Marine Reserve of Illes Malgrats (Spain),
- National Hunting Refuge of Islas Chafarinas (Spain),
- Marine Reserve of Islas Columbretes (Spain),
- Marine Protected Area of Islas Medas (Spain),



- Marine Reserve of Masia Blanca (Spain),
- Marine Reserve of Migjorn de Mallorca (Spain),
- Marine Reserve of Norte de Menorca (Spain),
- Fishing Marine Reserve of Ses Negres (Spain),
- Natural Reserve of Bouche de Bonifacio (France),
- Marine Natural Reserve of Cerbère-Banyuls (France),
- Marine Park of Côte Bleue (France),
- National Park of Port-Cros (France),
- Natural Reserve of Scandola (France),
- National Marine Park of Alonissos-Vories Sporades (Greece),
- National Marine Park of Zakynthos (Geece),
- National Park of Archipelago di La Maddalena (Italy),
- National Park of Archipelago Toscano (Italy),
- Marine Protected Areaof de Asinara (Italy),
- Marine Protected Area of Capo Caccia - Isola Piana (Italy),
- Protected Marne Area of Capo Carbonara (Italy),
- Protected Natural Marine Area of de Capo Gallo (Italy),
- Protected Maritime Area of Capo Rizzuto (Italy),
- Protected Natural Maritime Area of Cinque Terre (Italy),
- Marine Protected Area of Isole Ciclopi (Italy),
- Protected Natural Marine Area of di Ventotene e santo Stefano (Italy),
- Protected Natural Marine Area of Isole Egadi (Italy),
- Protected Natural Marine Area of Isole Pelagie (Italy),
- Protected Natural Marine Area of Isole Tavolara - Punta Coda Cavallo (Italy),
- Protected Natural Marine Area of de Isole Tremiti (Italy),
- Marine Protected Area of de Miramare (Italy),
- Marine Protected Area of de Penisola del Sinis (Italy),
- Protected Natural Marine Area of Porto Cesareo (Italy),
- Protected Natural Marine Area of Portofino (Italy),
- Protected Natural Marine Area of Punta Campanella (Italy),
- Marine Protected Area of Secche di Tor Paterno (Italy),
- Marine Protected Area of Torre Guaceto (Italy),
- Protected Natural Marine Area of Ustica (Italy),
- Natural Reserve of Palm Island (Lebanon),
- Protected Area of Corail Rouge (Monaco),
- Protected Area of Larvotto (Monaco),
- Natural Monument of Cape Madona (Slovenia),
- Natural Monument of Debeli Rtic (Slovenia),
- Natural Reserve of Strunjan (Slovenia),
- Protected Area of Fanar Ibn Hani (Syria),
- Protected Area of Om Al Toyour (Syria),
- Protected Area of Ras El Bassit (Syria),
- Natural Reserve, Protected Marine and Coastal Area of Archipel de la Galite (Tunisia),
- National Park, Protected Marine and Coastal Area of Zembra & Zembretta (Tunisia),
- Specially Protected Area, Area of Nature Protection, Area of Archaeological protection of Kekova (Turkey),

Available documents:

- Regulation.



Useful adresses

MedPAN

www.medpan.org

Project Coordinator :
Catherine Piante
cpiante@wwf.fr

Administrative person in charge of the project:
Jean-Pierre de Palma
jpdepalma@wwf.fr

Tool: The Mediterranean MPA repertory by country.

Submed

www.submed.org

Leader :

REGIONE LIGURIA
Via Fieschi, 15 - 16 121 GENOVA
Italie
Guendalina Prandi
guendalina.prandi@regione.liguria.it
www.regione.liguria.it
Tel : 1 0039 0 105 484 714
Fax : 0039 0 105 484 777

Partners (alphabetically)

IPIMAR – Instituto Nacional de Investigação Agrária e das Pescas
Miguel Neves dos Santos
AV. 5 de Outubro s/n
8700-305 OLHÃO
Portugal
Tel : 00351 289 700 504
Fax : 00351 289 700 535
mnsantos@ipimar.ualg.pt

Parco Nazionale dell'Asinara
Vittorio Gazale
Via Iosto, 7
PORTO TORRES
Italy
Tel : 0039 079 504 00 00
Fax : 0039 079 50 14 15
gazale@asinara.org

Toulon Provence Méditerranéenne
Thierry Asni
136, Bd du Maréchal Leclerc
83000 TOULON
France
Tel : 0033 (0)4 94 93 69 29
Fax : 0033 (0)4 94 93 64 99
tasni@tpmed.org

Universities

Laboratoire Ecosystèmes Aquatiques Tropicaux et Méditerranéens
FRE EPHE-CNRS 2935
Univ. de Perpignan
52 av P. Alduy
66860 Perpignan cedex
France
lenfant@univ-perp.fr

Grupo de Investigacion
« Ecologia y Ordenacion de Ecosistemas Marinos Costeros »
Departamento Ecologia e Hidrologia
Facultad de Biologia
Universidad de Murcia
Campus de Espinardo
30100 Murcia
Espana
jcharton@um.es

Engineering and design department in maritime environment.

OCEANIDE
1 Quai Silguy
40000 Mont de Marsan
France

Nicolas Dalias
OCEANIDE
Agence Méditerranée
7 Rue de Turenne
France
Tel : 0033 (0)6 20 11 58 75
nicolas.dalias@voila.fr

Association

Longitude 181 Nature
12 rue La Fontaine
26000 Valence
France
www.longitude181.org
contact@longitude181.com
Tel : 04 75 55 43 77
Fax : 00 33 (0)4 75 43 34 03

GEOM
27, rue robert schuman
83110 SANARY
France
geom@oceanica.net
Contact : Nicolas GILBERT
Tel : 0033 (0)6 63 72 12 04

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Appendix

LES DIX COMMANDEMENTS DU BON PLONGEUR

Vous plongez au sein d'une structure qui est partenaire de la réserve naturelle marine de Cerbère-Banyuls.
Ce partenariat s'est concrétisé par la signature d'une charte de plongée dont les principaux points relatifs à un comportement respectueux du milieu sous-marin sont repris ci-dessous.

- Ne jamais remonter en surface ni animaux, ni végétaux (même s'ils sont déjà morts).
- Ne pas nourrir les animaux.
- Ne pas toucher les organismes fixés ou libres.
- Eviter le palmage dévastateur.
- Eviter de se coller aux parois et aux tombants afin de pas dégrader la faune et la flore qui y sont fixées.
- Faites attention à vos bulles d'air qui peuvent se trouver emprisonnées au niveau du plafond des grottes : elles entraînent inévitablement la mort des organismes qui y vivent.
- Eviter de retourner les pierres et les rochers, et dans tous les cas les remettre dans leur position initiale.
- Limiter l'utilisation des éclairages.
- Les oursins, même s'ils piquent, sont des animaux comme les autres, ils ne méritent pas d'être cassés pour attirer les poissons.
- Procéder, quand cela est possible, au ramassage des détritus ou contactez la réserve marine pour indiquer leur position.

Vos encadrants sont sensibilisés à tous ces gestes de bonne conduite. N'hésitez pas à les solliciter pour avoir de plus amples informations.

Réserve Marine naturelle
BANYULS • CERBÈRE

CONSEIL GENERAL
PYRENEES-ORIENTALES

Association
LONGITUDE 181
NATURE

presents

INTERNATIONAL GUIDELINES
FOR RESPONSIBLE DIVER

Albert Falco
Former chief diver and captain
of the "Calypso"
Honorary President
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François Sarano
Former scientific adviser to
Commandant Cousteau
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Sous-Marins

With
Jean-Michel Cousteau
President of Ocean Futures Society

Longitude 181 NATURE - 12, rue la Fontaine - 26000 Valence - France
Tel : + 33 (0)4 75 55 43 77 - mobile : + 33 (0)6 15 88 23 19
e-mail : longitude181@wanadoo.fr
site : www.longitude181.com

Association
LONGITUDE 181
NATURE

Dear Diver,

You are going to visit beautiful coral reefs, rub shoulders with sharks,
meet whales, and discover the Ocean universe.

To do this you are going to spend a few days in a country
where fishermen, farmers and tradesmen live all year round.
Their traditions are different from yours.
The natural resources on which they survive are often in short supply.
Fresh water, in particular, is rare and priceless.

The life of the country is not just the hotel you are staying at,
however pleasant. Why not use your spare time between dives
to meet the locals and listen to their stories ?
You may be astonished by their cultural heritage and hospitality.

Your purchasing power is, very often, much higher than theirs.
Do not push them to damage the sea and, in the long run,
impoverish the fishermen by buying sad souvenirs like shark teeth, shells,
corals and tortoiseshells. Firmly refuse shark fin and tortoise soups,
scandalously raped from the sea. These animals could disappear.

Under the water, you will be visiting a living, splendid but fragile world.
Collisions and shocks crush and kill the fixed animals which do such much
to enchant the seascapes you came to admire.
All disturbances can frighten fish which protect their eggs,
leaving their fray for the predators.
Please do not feed the fish as this disturbs the balance between species
and changes their natural behavior.

You will expect to find all the treasures of the wild marine universe
as wonderful in the future as during your visit today.
You would like to share these joys with your friends and your children,
so be curious about everything but remain discrete and attentive
and watch out for clumsiness !
Your behavior today will ensure that future generations of divers
can enjoy this marvelous world and the thrills of meeting sharks and whales
in an underwater adventure as colorful as yours.

François Sarano
President of Longitude 181 Nature

When adventure calls.
Become the diving ambassadors
of the Third Millennium...

Guidelines for responsible divers

This charter proposes guidelines and not a list of restrictions!
Apply the suggestions case by case since diving spots
and situations change from place to place.
The basic idea is to get people to think about
how to optimize diving conditions
to protect and ensure fair sharing of the Oceans' treasures.

Prepare your journey

Not all travel agencies and diving centers offer the same services.
Some try to protect the environment they help you explore and share natural resources more fairly with host country inhabitants.
This may cost them money and make your trip more expensive but together you will contribute to the sustainable development of our planet.
The cost per dive should not be your only selection criterion.

- **Choose a travel agency which has agreed to respect ethical guidelines**
- **Prefer Responsible Diving Centers** which are concerned with the protection of sea-beds (treatment of solid and liquid wastes, use of mooring buoys etc.) and have invested in local development projects.
- **Find out about the marine ecosystems** you will be exploring.
- **Find out about the inhabitants of the country** you are visiting : their traditions, economy and resources.

Before diving

- **Get fit**
If you have not dived for a long time, train yourself to manage your buoyancy: lung-ballast, weight jacket, optimized ballasting, etc.
- **Find out about the dive spot you are exploring** before you go. You will enjoy your dives so much more as you will not just be a passive witness in a world in which you cannot speak the language. Learn to read the first pages of the big marine life book. If you can identify the animals, and know how they behave, you will know where to find them. Much of this incredible fauna is hidden.
- **Ask your diving center to give you a presentation of the local ecosystem**
- **Ask for the list of threatened species**, the list of protected species and all relevant regulations.
- **Ask about what the diving center does** to protect the sea (mooring buoys, etc.)

On the boat

- **Never throw anything overboard.**
- **Refuse plastic plates and cups** which take scores of years to break down.
- **Ask for dustbins on the deck** for (if you absolutely need to smoke) cigarette butts (they take months to break down) plastic waste, aluminum foil, etc...
- **Take care to attach spare air valves,** consoles and pressure gauges firmly so they do not dangle and damage fixed flora and the fauna.
- **Use short, recreational, flippers.**

When diving

- **As soon as you enter the water, check your weights** and adjust if necessary.
- **Use you flippers gently,** so as not to collide with fixed marine life
- **Avoid contact with fixed plants and animals.** They are fragile and can be destroyed by repeated shocks.
- **Do not bring anything back** except pictures!
- **Do not bother the animals.** If they take refuge in their hiding-place, do not force them out - they are already stressed enough. Wait without moving until they calm down and come out again.
- **Do not feed the fish.** You change their behavior and unbalance the ecosystem.

After diving

- **Save fresh water.** It is the most valuable commodity on Earth.
- **Ask for equipment designed to conserve fresh water** like equipment wash tanks and controlled flow showers.

During your holidays

- **Try to get outside your diving center or hotel.** There is a world out there waiting to meet you!
- **Do not buy souvenirs ripped from the sea** like shark teeth, tortoiseshells, starfish, sea horses and other dried fish, coral and shells.
- **Boycott restaurants which serve shark fin soup,** tortoise meat, cetaceans and fish caught by destructive means like dynamite, cyanide, etc.
- **Ask restaurants how the sea fare they propose is fished** and what agreements they have with local fishermen.

Association
LONGITUDE 181
NATURE

Guidelines for diving centers

This charter proposes guidelines : and not a list of restrictions !
Apply the suggestions case by case since diving spots,
situations change from place to place.
The basic idea is to get people to think about
how to optimize diving conditions
to protect and ensure fair sharing of the Oceans' treasures.

Diving centers are ideal places for visiting divers to meet the underwater world and learn the lore and language of the host country.
Center managers are the ideal people to awake divers' curiosity and provide information about underwater treasures as well as the local cultural heritage.

When divers arrive

- **Present the center in its context** : the country, the inhabitants, their traditions and the economy.
- **Present the underwater ecosystem**. In addition to the beauties and uniqueness of the diving spots, explain their fragility (protected, threatened and endemic species), the importance of the relationships between the species and the vulnerability of the smallest and mimetic species.
- **Detail the precautions to take when diving**, the legislation concerning protected species (detention and trade) and regulations inside reserves.
- **List the fish and seafood served in restaurants** and detail the species that can be eaten without endangering the ecosystem and those that should not be eaten to prevent their disappearance.

Responsible diving instructors

- **Instructors have a marvelous responsibility.** Over and above teaching diving and safety, it is up to you to make divers curious and enthusiastic about respecting and protecting the natural habitat you are helping them to explore.
- **Take every opportunity to remind your visiting divers** that the marine environment is fragile and that is up to them to protect it.
- **You can also remind them that your center is located in a community** with which it shares the natural resources (fresh water, food, marine life...)
- **Never forget that you are the role model** for your divers and that they will always do as you do.

Understanding diving spots and long-term management

- **Diving spot health inventory and follow-up.** To protect all the marine treasures in diving spots, the first step is to make an inventory of what exists. Team up with other centers working in the same spots to prepare this list or work with local environnemental association or call in consultant biologists who will explain the essential factors to monitor. Regular audits will tell you what is happening and what needs to be done for long term protection. This inventory is a vivid source of information for visiting divers.
- **Mooring buoys should be installed** in each diving spot to prevent the destruction of fixed flora and fauna by random anchoring.
- **Limit the number of divers** to protect marine life from excessive disturbance.
- **Stop diving in over-visited spots** and spots sheltering fragile species during the seasons when they reproduce.
- **Promote the creation of protected areas** in agreement with local authorities. Use these areas as control zones to measure what is happening elsewhere. These protected area will replenish populations in damaged areas.

Ecological diving centers

Your diving center exists to help others discover the beauties of nature. Protect nature with waste management systems and use renewable energies.

- **Waste recovery and treatment.** Limit the waste generated by the center (plastic plates, mugs, bottles, etc...). Collect and take spent batteries, used oils and toxic wastes to reprocessing or recycling plants.
- **Fresh water saving and recycling.** Washing diving gear in rinsing tanks, fitting controlled flow showers, building rainwater catchment systems and recycling of used sanitary water in toilets are all good ideas.
- **Renewable energies** Wind and solar power are the best.

Fair shares In an interdependent economy

- **Train and use local inhabitants** in the diving team.
- **Share fresh water fairly with local inhabitants,** particularly farmers, in countries where water is rare.
- **Select the fish served in restaurants**

Diving center managers, fishermen and local authorities should jointly decide on the authorized fishing quotas for the most fragile species (lobsters, groupers, etc.). Consumers are quite happy to eat less fragile species if they are told why. Center restaurants should never serve fish or seafood fished with destructive methods, gravid crustacean shellfish or undersized fish and fray.

- **Finance local development projects** using a percentage of your income from diving (a dollar or two). Projects can include schools, irrigation systems, water saving systems, solar energy ñ and the organization of fishing to ensure sustained development.

Longitude 181 Nature
12, rue la Fontaine
26000 Valence
France
longitude181@wanadoo.fr
www.longitude181.com

REGIONAL AUTHORITY OF THE PYRENEES ORIENTALES BANYULS CERBERE NATURAL MARINE RESERVE

DIVING PARTNERSHIP CHARTER

STATEMENT OF INTENT

Noting the increase in diving activities in the Cerbère-Banyuls Natural Marine Reserve,
Bearing in mind the common interest to :

- protect the seabed within the reserve;
- promote a more specifically educational diving activity oriented towards scientific discovery in the reserve ;
- ensure the protected marine areas remain totally or partially accessible to divers to discover and to learn about the marine environment;
- work together to maintain the quality of the site and of the diving opportunities provided therein;

The Regional Authority of the Pyrenees-Orientales, under whose authority the Reserve is managed,

On the one hand,

And the diving enterprises and associations, cosigners

On the other hand

Have decided by mutual agreement to apply the present charter.

Preamble: Within the Cerbère-Banyuls Natural Marine Reserve, there exists opposite Cap Rédéris, a higher protection level zone, also termed an "integral reserve", defined by law 90-750 of 6 September 1990. The adjoining area (the zone outside the higher protection area) will be referred to below as the "General Reserve".

Article 1: The present charter will apply to scuba diving in the general reserve since diving in totally prohibited in the integral reserve except within the framework of scientific work approved by the Reserve's consultative committee.

Article 2: The cosigning persons in charge of diving enterprises and associations undertake to ensure their diving managers respect the regulations of the Cerbere-Banyuls Natural Marine Reserve and the present charter. Signature of the latter implies acceptance of the appended terms of reference.

Article 3: The signing and respect of the present charter will confer upon cosigners the right to use the label "PARTNERS OF THE CERBERE-BANYULS NATURAL MARINE RESERVE" . this label is based on a commitment involving training and behaviour in a protected and sensitive natural protected area.

The materials on which this label will appear as well as its graphic representation will be decided by the General Council.

The partnership agreement, connected to the label, will be marked by a panel or poster given to each partner.

Article 4: The attribution of the "PARTNER OF THE CERBERE-BANYULS NATURAL MARINE RESERVE " label is examined on a yearly basis. Partners will undertake, as a preamble to the first annual information meeting, to renegotiate if necessary the terms of the present charter and appended terms of references and to assess its practical implementation.

Article 5: Any serious breach of the Reserve's regulations and of the present charter observed by the staff of the Reserve will lead to withdrawal of the "PARTNER OF THE CERBERE-BANYULS NATURAL MARINE RESERVE" label by the Regional Authority of the Pyrenees Orientales as well as of the material mentioned in article 3.The decision in this respect must be followed by immediate implementation and all measures must be taken to remove the label from all the materials on which it could figure, in whatever shape or form.

Drawn up in Perpignan, on

The President of the Regional Authority
Of the Pyrénées-Orientales

Christian BOUQUIN

The Diving enterprises and
associations

Terms of reference

Article 1: Divers must be equipped with a stabilizing jacket to enter the Natural Marine Reserve, except for divers (children, disabled persons) whose stabilization is entirely managed by a monitor.

Article 2: The cosigning persons in charge of diving enterprises and associations and their diving managers commit themselves to act with courtesy and to respect the Natural Marine Reserve site. They will, in particular, reduce the use of anchors by using the mooring facilities that will be put in place in consultation with the cosigners whenever possible.

In case of anchorage, the head of the buddy team will check, and if need be move, their mooring if it is liable to damage the sea bed (for ex. Coralligenous, posidonia)

Article 3: The Natural Marine reserve will undertake to produce documentary materials and to hold annual awareness building meetings designed to promote diving activities that respect the marine environment. At the end of the season, the Reserve will draw up an assessment of annual visitation of diving sites and its impact on the environment as soon as the necessary data is available.

Article 4: The cosigning persons in charge of diving enterprises and associations and their diving managers undertake to:

- attend the annual awareness building and information meetings
- disseminate an educational message and promote the biological discovery of the Natural Marine Reserve sites;
- return to management the register recording occupation and number of divers visiting diving sites that the Reserve will have previously provided them with.

Article 5: The cosigning persons in charge of diving enterprises and associations and their diving managers undertake to ensure the environment is respected and in particular to :

- not feed the fish or touch any fixed organisms,
- limit the use of underwater lighting
- avoid destructive fining
- prohibit the use of underwater scooters
- collect waste during diving sessions

Article 6: The cosigning persons in charge of diving enterprises and associations and their diving managers undertake to inform the Natural Marine Reserve, by VHF or telephone, of any observations or unusual occurrences they may have observed on the sites (abandoned nets, proliferations or drops in populations of marine organisms, etc.) and of any breach to the Natural Marine Reserve regulations and of this Charter.

Drawn up in Perpignan, on

Read and approved

Signature

YEAR 2006

PORT-CROS NATIONAL PARK DIVING CHARTER

With a view to assure the preservation of a highly valuable natural, cultural and landscape environment as well as the practice of diving activities aimed at the discovery, recognition and contribution to the management of underwater environment,
The Port-Cros National Park, on one hand,
And individual divers, diving centres and diving equipment suppliers, on the other hand, signatories to this Charter,
Have agreed as follows:

Chapter I: Principles and definitions :

Article 1: This Charter concerns scuba diving in the waters of Port-Cros National Park.

Article 2: Individual divers, diving centres and diving equipment suppliers shall sign this Charter before making, planning or supporting the first dive in the course of the year under question.

Article 3: The Charter enters into force on the day of its signature and ends on December 31st of the same year.

Article 4: The signature of this Charter shall not either bypass the laws, rules and regulations in force or limit their scope of application, with special reference to rules and regulations envisaging the protection and preservation of the biological heritage, flora and fauna present in the National Park.

Article 5: According to this Charter,

- An « individual diver » is a person practicing scuba diving with his/her own equipment.
- A « diving centre » is a natural or legal person (association, sports club, sole-proprietor firm or general partnership) in charge of the diving, of its organisation and supply of the diving logistic support.
- A « diving equipment supplier » is a natural or legal person (association, sole-proprietor firm or general partnership) supplying material and logistic support (i.e. diving equipment, boat,…) to any individual diver without planning the diving itself.

Chapter II: Obligations concerning the information to be provided to divers and the diving organisation :

Article 6: Diving centre managers and diving equipment suppliers shall draw the attention of their divers and diving instructors accessing the Park area on the great sensitivity of the protected sea and underwater environment and landscapes, highlighting the need to strictly abide by and to enforce the National Park regulations, as well as the provisions set forth by this Charter, and, in particular, avoid any voluntary or involuntary contact with the substratum or species.

Article 7: The National Park authorities shall assist diving centres and diving equipment suppliers, signatories hereto, to prepare information brochures addressed to the divers who are taken care of or supported by them, to raise their awareness and to inform them about the sea and underwater environment and landscapes.

Article 8: The number of divers will be limited according to the circumstances described here below :

- Diving centres, diving equipment suppliers and individual divers are entitled to only one half-day trip towards the same dive site, in the marine Park area,
- No more than 40 divers are allowed to dive simultaneously in the same equipped or non-equipped dive site, whatever the number of boats is. As for the « Tantine » dive site, also known as « Barge aux congres », this number has been lowered down to 20 divers maximum. In any case, divers shall avoid crossing with other divers' groups.

Article 9: Individual divers, diving centre and diving equipment managers, signatories hereto, as well as their diving instructors, shall act with courtesy and respect the order of access to the dive site; they shall wait for the previous diving team to leave the site, for at least 15 minutes before starting the new dive with one's own divers.

Article 10: At least a first-class diver qualification and/or the knowledge of at least pressure equalization technique is required to dive in the National Park waters, except for the following dive sites: Dalles de Bagaud, Montrémian point, Charettes point, de la Croix point, Tuf and Nertassier points and along the submarine trail.

Article 11: The technical training dives shall be held only in the following dive sites : Dalles de Bagaud , Montrémian point, Charettes point, Tuf and Nertassier points and along the submarine trail.

Article 12: The first dive experience cannot take place in « la Gabinière » site.

Chapter III: Behaviour Obligations :

Article 13: The signatories to this Charter, be they individual divers, users or diving centre managers or diving equipment suppliers, shall :

- Limit the use of underwater lamps,
- Adopt or encourage the use of ABLJ (Adjustable Buoyancy Lifejacket) to avoid finning, which might damage flora and fauna,
- Avoid all voluntary or involuntary physical contact with the substratum or species
- Do not feed animals,
- Do not use any underwater scooters.

Chapter IV: Annual Evaluation - Cooperation :

Article 14 The signatory divers shall notify the National Park about the presence of *Caulerpa taxifolia and Caulerpa racemosa* algae observed in the Park waters or in the neighbouring areas.

Article 15: Individual divers, diving centre managers and diving equipment suppliers, signatories hereto, as well as their diving instructors, shall call the National Park authorities, either by telephone (n° 04.94.01.40.70 or emergency n° 04 94 05 92 14) or by VHF (Channel 16), to inform them about any abnormality observed in the dive sites (any abandoned nets, proliferation or thinning of the sea organism populations, misuse, etc.).

Article 16: At the end of the season, diving centres and diving equipment suppliers, signatories hereto, shall submit **a final report** to the National Park authorities about their diving activities in the Park area (number of dives, sites, frequency of use).

Chapter V: Sanctions :

Article 17: In the event of any breach of the laws, rules and regulations concerning the preservation of the National Park biological heritage, of its flora and fauna, the author of such breach shall be fined by the authorized park agents or shall be prosecuted , according to the law in force.

Article 18: If an individual diver has been fined once during the same year for having contravened the National Park rules, this will lead to the immediate resolution of the Charter, which cannot be renewed the following year.

Article 19: In the event of any violation by the diving centres and by the diving equipment suppliers concerning their information duty towards divers or their diving organisation duties, as set forth by chapters II and III (Articles 6 to 16) thereof, they shall receive a notification by recorded delivery letter with advice of delivery within 8 days since the infringement of the law has been detected by the National Park agents.
If a diving centre or diving equipment supplying facility is fined twice (2 times) during the same year, for having violated the National Park regulations in relation to divers being taken care of or assisted by the same diving centre or diving equipment supplying facility, the latter shall receive a notification according to the afore mentioned terms and conditions.
If a diving centre or diving equipment supplier has received two (2) notifications during the same year, this will lead to the immediate resolution of the Charter, which cannot be renewed the following year.

The National Park Director

The diver, the diving centre manager
Or the diving equipment supplier (1)

The name and address of the diver,
Of the diving centre manager
Or of the diving equipment supplier and
name of the ship

Data and Registration Number:

(1) *Please tick off the unwanted item*

Charte liant les établissements de plongée subaquatique et la réserve naturelle des Bouches de Bonifacio

Dans le cadre de la mise en place du parc marin international entre la Sardaigne et la Corse,
Soucieux de contribuer à la préservation du « capital nature » de la réserve naturelle des Bouches de Bonifacio tout en facilitant sa découverte par le public,
Conscients de leurs intérêts communs vis-à-vis de la promotion de la plongée subaquatique, activité indispensable à la sensibilisation du public, mais qu'il convient d'organiser en limitant les perturbations qu'elle pourrait occasionner,

- *l'Office de l'Environnement de la Corse, gestionnaire de la réserve naturelle des Bouches de Bonifacio d'une part,*
- *les établissements de plongée, signataires d'autre part,*

décident de l'application en commun de la présente charte.

Article 1 : Les responsables des établissements de plongée et les plongeurs individuels signataires s'engagent à faire respecter par leurs directeurs de plongée, leurs moniteurs et leurs chefs de palanquée, la réglementation en vigueur dans la réserve des Bouches de Bonifacio ainsi que la présente charte.

Article 2 : L'accès aux différents sites de la réserve naturelle nécessitant un niveau technique de plongée adapté aux conditions de milieux, les responsables des établissements de plongée et les plongeurs individuels signataires de la présente charte, s'engagent à accompagner dans les zones de protection renforcée des plongeurs maîtrisant le lestage, l'équilibrage et le palmage pour limiter les contacts répétés avec les fonds marins, et éviter la destruction de la faune et de la flore.

Article 3 : Au cours des plongées de formation technique ou des baptêmes organisés dans les zones de protection renforcée et nécessitant un appui sur le fond, les formateurs veilleront à ce que ces appuis se fassent de préférence dans les zones sableuses.

Article 4 : Sur l'ensemble des zones de protection renforcée, le nombre de plongeurs par palanquée sera limité à 5 (chef de palanquée compris).

Article 5 : Les plongeurs individuels et les responsables des établissements de plongée signataires, leurs directeurs de plongée et leurs chefs de palanquée, s'engagent à respecter et à faire respecter l'environnement, en particulier en :

- limitant l'usage des éclairages artificiels,
- évitant les nuisances sonores,
- réduisant les passages sous les surplombs et dans les grottes occasionnant l'accumulation de bulles d'air,
- proscrivant le nourrissage des poissons et le contact direct (toucher) avec les poissons et les crustacés.

Article 6 : Les plongeurs individuels et les responsables des établissements de plongée signataires, leurs directeurs de plongée et leurs chefs de palanquée, s'engagent à respecter l'ordre d'accès aux sites et les règles de sécurité, notamment au moment des immersions.

Article 7 : Les responsables des établissements de plongée signataires s'engagent à ne pas favoriser la diffusion de messages ou d'images contraires à l'esprit de la présents charte.

Article 8 : Dans la mesure du possible, les signataires de la présente charte s'engagent à pratiquer le mouillage de leurs embarcations sur des fonds sableux ou sur les coffres mis à leur disposition. En dehors des situations précédentes, ils s'engagent à faire remonter les ancres, par un plongeur, à l'aide d'un parachute.

Article 9 : Le gestionnaire de la réserve naturelle des Bouches de Bonifacio s'engage à :

- aider à la réalisation de matériels pédagogiques afin de promouvoir la sensibilisation, l'information et la formation des plongeurs et de leurs encadrants pour une meilleure connaissance du milieu marin et sa préservation par tous,
- associer les signataires de la charte aux discussions liées à l'organisation de la plongée dans la réserve naturelle et à l'évolution de la présente charte, notamment avant toute décision engageant l'activité des établissements de plongée.

N.B. : A terme, les dispositions prises dans cette charte pourront s'imposer à tous les acteurs de la plongée sous-marine intervenant au sein des zones de protection renforcée. L'autorisation de plongée sur les sites les plus sensibles pourra être assujettie à la signature et au respect de cette charte.

Le Président de l'Office de l'Environnement de la Corse
Il Presidente dell'Uffizio dell'Ambiente della Corsica

Jérôme POLVERINI

Le responsable du club de plongée
Il responsabile del centro subacqueo

Réserve Naturelle
DES BOUCHES
DE BONIFACIO

Office de l'Environnement de la Corse

Charte de partenariat de plongée sous-marine de la zone marine agathoise

Dans le cadre du site Natura 2000 « Posidonies du Cap d'Agde » et du Défi territorial sur la zone marine agathoise ayant pour objectif de réfléchir sur la mise en place d'un Espace Littoral de Gestion Associée -ELGA-, dans une perspective de préservation d'un écosystème marin riche associée à un développement économique durable des activités maritimes

Les établissements de plongée cosignataires
d'une part

et l'ADENA,
d'autre part,

sont convenus par cette présente charte à tendre vers cet objectif global
selon les dispositions suivantes :

Une responsabilité durable

Article 1 : La présente charte s'applique à la plongée en scaphandre autonome dans la zone marine agathoise s'étendant de la Tamarissière à Marseillan plage.

Article 2 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires s'engagent à faire respecter auprès de leurs moniteurs les prescriptions de la présente charte.

Article 3 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires utiliseront en priorité les mouillages « *harmony* » sur le site dit des Tables pour amarrer leur embarcations ou ancreront en périphérie du site sur les zones sableuses.

Article 4 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires utiliseront en priorité la zone de délestage aux ancrages sur le site dit de la Muraillette.

Article 5 : Les formations techniques des plongeurs devront s'effectuer en dehors des sites où la fragilité du milieu pourrait être accentuée par les sollicitations techniques de l'exercice (à l'exclusion des exercices d'orientation et de conduite de palanquée)

Article 6 : Pour des raisons de partage de l'espace maritime et de sécurité, les responsables des établissements de plongée -associatifs et professionnels- et leurs moniteurs cosignataires évoluant aux abords de l'îlot de Brescou regrouperont leurs embarcations dans un même secteur et signaleront chacune de leurs palanquées à l'aide d'une bouée de surface.

Article 7 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires s'engagent à laisser libre le chenal d'accès au débarcadère de Brescou pour les bateaux de promenade. Coordonnées d'entrée du chenal : 43° 15' 856''N 003° 30'113''E et 43° 15'881''N 003° 30'052'' E.

Article 8 : Les responsables des établissements de plongée -associatifs et professionnels- et leurs moniteurs cosignataires, soucieux de la préservation du milieu et de la pérennité des sites, s'engagent à respecter et à faire respecter les éco-gestes suivants :

- ne pas toucher, nourrir ni pourchasser tous organismes vivants,
- limiter l'utilisation des éclairages sous-marins,
- procéder au ramassage des détritus au cours de leur évolution (en surface ou en immersion),
- réduire les passages sous les surplombs occasionnant l'accumulation des bulles d'air*,
- veuillez à la bonne maîtrise de la flottabilité de leurs plongeurs**
- éviter la remise en suspension des vases

Avec une attention toute particulière pour : * l'épave de l'Obéron.
** le site dit des moyennes Tables.

Article 9 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires s'engagent à avoir en permanence une poubelle accessible à bord de leur embarcation afin d'éviter toute pollution et procéder à leur tri en zone portuaire.

Une mission pédagogique commune

Article 10 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires s'engagent à diffuser un message pédagogique orienté vers la découverte et la protection de la biodiversité marine.

Article 11 : L'ADENA s'engage à aider à la réalisation de documents d'information ayant pour thème la sensibilisation et la connaissance du milieu marin.

Article 12 : L'ADENA s'engage à contribuer avec les établissements de plongée, et à leur demande, à la formation des moniteurs sur la protection du milieu marin, sous forme notamment de sorties thématiques sur les sites, d'exposés ou de conférences annuels.

Une veille écologique partagée

Article 13 : Les responsables des établissements de plongée -associatifs et professionnels- cosignataires s'engagent à signaler à l'ADENA toutes observations ou anomalies observées sur les sites (filets abandonnés, proliférations ou diminutions d'organismes marins, pollution…).

Une concertation annuelle

Article 14 : Les signataires de la charte fourniront en fin de saison à l'ADENA la fiche d'occupation et de fréquentation des sites.

Article 15 : Les partenaires s'engagent à se rencontrer en fin d'année pour évaluer l'application pratique de la charte et à réfléchir sur ses perspectives d'évolution.

Le responsable de l'établissement L'ADENA

Date :

PERMISOS PER FER IMMERSIÓ

Tota immersió que s'hi vulgui efectuar requereix l'obtenció d'una llicència específica. (Art. 4b)

Lloc: Oficina de la Direcció General del Medi Natural, a l'Estartit.

Per obtenir el permís caldrà estar en possessió de:
- Títol de busseig de 2a. classe o superior o els equivalents internacionals.
- Llicència federativa o assegurança privada.
- Documentació del vaixell (Rol).

Per aquells que acreditin un títol d'iniciació hauran de ser acompanyats per un cabussador amb titulació superior, com a màxim 4 cabussadors per monitor o guia.

Previ pagament de la taxa, se'ls lliurarà el permís a on s'indicarà la zona d'amarratge (boia taronja) i la franja horària.

LLOCS D'AMARRATGE

"Les embarcacions només poden fondejar en els llocs preestablerts pel Departament d'Agricultura, Ramaderia i Pesca, mitjançant boies d'amarratge" (Llei 19/90, article 4 lletra C)
Les boies d'amarratge pel seu ús són de color:

GROC: destinada exclusivament a les **embarcacions dels centres turístics de busseig autoritzats.**

TARONJA: destinada exclusivament a les **embarcacions d'escafandristes particulars amb permís d'immersió.**

VERMELL: destinada a l'amarratge d'**embarcacions particulars.**

Generalitat de Catalunya
Departament d'Agricultura,
Ramaderia i Pesca
Direcció General del Medi Natural

Generalitat de Catalunya
Departament de Medi Ambient
i Habitatge
Direcció General del Medi Natural

Àrea Protegida
de les Illes Medes

I 02551

ACTIVITATS D'IMMERSIÓ AMB ESCAFANDRE AUTÒNOMA — GRUP B

El Sr/ Sra. ----------

En representació del Centre d'Immersió ----------

Amb domicili al municipi de Torroella de Montgrí - L'Estartit, Comunica que es realitzaran les activitats d'immersió amb escafandre autònoma a l'Àrea estrictament protegida de les Illes Medes, d'acord amb les dades següents:

☐ Participants ☐ Acompanyants ☐ Guies / Monitors

Nom i cognoms participants	Titulació	Nacionalitat
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
Nom i Cognoms dels guíes/monitors		
Nom i Cognoms del Patró		

Embarcació Principal	
Data	
Franja Horària	
Punt d'Amarrament	

Signatura **Validació**

Data:

AJUNTAMENT DE DÉNIA **AJUNTAMENT DE XÀBIA**

SOLICITUD INDIVIDUAL DE ADMISIÓN DE CONTINGENTES DE BUCEO
RESERVA MARINA DEL CABO DE SAN ANTONIO

SOL·LICITUD INDIVIDUAL *D'ADMISSIÓ DE CONTINGENTS DE BUSSEIG*
RESERVA MARINA DEL CAP DE SANT ANTONI

DATOS DEL PETICIONARIO O RESPONSABLE DEL GRUPO:
DADES DEL PETICIONARI O RESPONSABLE DEL GRUP:

Apellidos: ..... Nombre: ..... D.N.I. .....
Cognoms: ..... *Nom:* ..... *D.N.I.* .....

Dirección: ..... Población: ..... Tel. .....
Adreça: ..... *Població:* ..... *Tel.* .....

Días solicitados / ***Dies sol·licitats:***

SOLICITA para cada una de las personas relacionadas en hoja adjunta:
SOL·LICITA per a cadascuna de les persones relacionades en el full adjunt:

Autorización para ejercer la práctica del buceo autónomo/semiautónomo en las aguas de la Reserva Marina del Cabo de San Antonio.
Autorització per exercir la pràctica del busseig autònom/semiautònom en les aigües de la Reserva Marina del Cap de Sant Antoni.

DOCUMENTACIÓN PRESENTADA (personas relacionadas en hoja adjunta):
DOCUMENTACIÓ PRESENTADA (persones relacionades en el full a banda):

☐ Título de buceador / *Títol de bussejador*

☐ Seguro de accidentes y de responsabilidad civil / *Assegurança d'accidents i responsabilitat civil.*
(Artículo 24, Orden de 14 de octubre de 1997 por la que se aprueban las normas de seguridad para el ejercicio de actividades subacuáticas, BOE nº 280, publicado el día 22 de noviembre de 1997)
(Article 24, Ordre de 14 d'octubre de 1997, per la qual s'aproven les normes de seguretat per a l'exercici d'activitats subaquàtiques, BOE nº 280, publicat el dia 22 de novembre de 1997)

☐ DNI o fotocopia / DNI o fotocòpia.

De acuerdo con la Resolución de la Dirección General de Indústria, Cooperativismo, Pesca y Relaciones Agrarias, por la que se autoriza un cupo máximo de buceadores al día en la Reserva del Cabo de San Antonio, el ***Ayuntamiento de*** .....

autoriza buceo en ☐ ***zona boya amarre núm.*** ☐ **Líbremente**

D'acord amb la Resolució de la Direcció General d'indústria, Cooperativisme, Pesca i Relacions Agràries, per la qual s'autoritza una quota màxima de bussejadors en la Reserva Marina del Cap de Sant Antoni, ***l'Ajuntament de*** .....

autoritza el busseig en ☐ ***zona boia d'amarrament núm.*** ☐ ***Lliurement***

Fecha: Firmado:
Data: *Signat:*

AJUNTAMENT DE DÉNIA

AJUNTAMENT DE XÀBIA

SOLICITUD COLECTIVA DE ADMISIÓN DE CONTINGENTES DE BUCEO
RESERVA MARINA DEL CABO DE SAN ANTONIO

SOL·LICITUD COL·LECTIVA *D'ADMISSIÓ DE CONTINGENTS DE BUSSEIG*
RESERVA MARINA DEL CAP DE SANT ANTONI

DATOS DEL PETICIONARIO O RESPONSABLE DEL GRUPO:
DADES DEL PETICIONARI O RESPONSABLE DEL GRUP:

Apellidos: ..... Nombre: ..... D.N.I. .....
Cognoms: ..... *Nom:* ..... *D.N.I.* .....

Dirección: ..... Población: ..... Tel. .....
Adreça: ..... *Població:* ..... *Tel.* .....

Días solicitados / ***Dies sol·licitats:***

SOLICITA para cada una de las personas relacionadas en hoja adjunta:
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autoriza buceo en	☐ ***zona boya amarre núm.***	☐ ***Líbremente***

D'acord amb la Resolució de la Direcció General d'indústria, Cooperativisme, Pesca i Relacions Agràries, per la qual s'autoritza una quota màxima de bussejadors en la Reserva Marina del Cap de Sant Antoni, ***l'Ajuntament de*** .....

autoritza el busseig en	☐ ***zona boia d'amarrament núm.***	☐ ***Lliurement***

GRAF. GARCIA CONTRI 96 578 79 83 DÉNIA

Fecha: ..... Firmado: .....
Data: ..... *Signat:* .....

AJUNTAMENT DE DÉNIA

AJUNTAMENT DE XÀBIA

SOLICITUD COLECTIVA DE ADMISIÓN DE CONTINGENTES DE BUCEO
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NOTA: Si la documentación de los solicitantes se presenta a posteriori de la inmersión al organismo del Ayuntamiento encargado de conceder las autorizaciones el peticionario SERÁ RESPONSABLE que cada persona autorizada disponga de la documentación mínima exigible por la legislación vigente. Así mismo, SE COMPROMETE a comunicar, con suficiente antelación a las fechas solicitadas, la relación de personas que desea sean autorizadas.

NOTA: Si la documentació dels sol·licitants es presentada després d'haver realitzat la immersió a l'organisme de l'Ajuntament encarregat de concedir les autoritzacions, el peticionari SERÀ RESPONSABLE que cadascuna de les persones autoritzades disposi de la documentació mínima exigible per la legislació vigent. El peticionari també ES COMPROMET a comunicar, amb la suficient antelació a les dates sol·licitades, la relació de persones que desitge que siguen autoritzades.

1º APELLIDO *1r. COGNOM*	2º APELLIDO *2n. COGNOM*	NOMBRE *NOM*	D.N.I.	TITULO/TÍTOL BUCEO / *BUSSEIG*	CIA. ASEGURADORA *CIA. D'ASSEGURANCES*	POBLACIÓN *POBLACIÓ*

EMBARCACIÓN *EMBARCACIÓ*	NOMBRE *NOM*	MATRÍCULA	MODELO *MODEL*	OBSERVACIONES *OBSERVACIONS*

GRAF. GARCIA CONTR. 96 578 79 83 DENIA

Area Marina Protetta del Promontorio di Portofino

Consorzio di Gestione

Viale Rainusso, 14-Villa Carmagnola-16038 S. Margherita Lig. (GE)
TEL. 0185/289649-FAX 0185/293002 – E-mail: amp.portofino@parks.it

Autorizzazione giornaliera per svolgere attività subacquee in zona "B"

Data della richiesta:..... Fax per risposta: .....

Valida per il giorno.....

Al Signor..... **Titolare del brevetto rilasciato da** ....**n°**.....

Al Signor..... **Titolare del brevetto rilasciato da** ....**n°**.....

Al Signor ..... **Titolare del brevetto rilasciato da** ....**n°**.....

Al Signor..... **Titolare del brevetto rilasciato da** ....**n°**.....

Al Signor..... **Titolare del brevetto rilasciato da** ....**n°**.....

Al Signor..... **Titolare del brevetto rilasciato da** ....**n°**.....

che, per raggiungere il sito di immersione, utilizzerà/utilizzeranno il natante.....

.....

.....

RISERVATO ALL'UFFICIO

Autorizzazione N°:.....**Numero natante**.....

Data dell'autorizzazione: S. Margherita Ligure,.....

Le attività autorizzate devono risultare conformi a quanto previsto dal Regolamento dell'Area Marina Protetta. (G.U. n°119 del 23.05.2002)

CONSERVARE A BORDO LA PRESENTE AUTORIZZAZIONE UNITA ALLA RICEVUTA DI PAGAMENTO

Comunicazioni: .....

Eunicella singularis : white gorgonia

Class : Anthozoaires
Order : Gorgonacés
Family : Plexauridés

Colonies of *Eunicella singularis* reach 20 to 50 cm in height.

The diameter of terminal branches is around 2 to 3 m. Ramifications are arranged in parallels. Polyps fully opened reach 3 mm.

This species settles on rocky areas, rocks, shellfish shells on soft substrate at a range depth of 5 to 60m.

This species prefers light and is not sensitive to sedimentation.

Between the end of June and the end of July, polyps of female colonies emit a very large number of larvae (planula). This phytoplanktonic larval stage occurs only few weeks. On the 60 000 larvae, only one will survive.

Pentapora fascialis : orange bryozoan

Class : Gymnolèmes
Order : Chilostomes
Family : Hypoporinidés

This is the biggest Bryozoan in Mediterranean sea

The colony shapes are variable, generally standing and can reach a diameter of 30cm for a height of 20cm. Branches are flat, more or less wider and irregularly lobed

This species occurs on rocky substrates.
All year round, ovicells are present; ovicells are incubation chambers for embryos until their transformation in larvae in winter and spring.

Paramuricea clavata : red gorgonia

Class : Anthozoaires
Order : Gorgonacées
Family : Paramuricéidés

Colonies are in panels positioned on the same plan, with irregular shapes and extremely ramified. This panel can reach a meter of height and wide.
The polyps reach a size of 8mm.

This species occurs between 10 and 110m on rocks, vertical faces and inside coralline.

The growth rate is around 1 to 6cm per year.

Corallium rubrum : red coral

Class : Anthozoaires
Order : Gorgonacées
Family : Corallidés

The colonies are bushy-like and the ramifications are oriented according several plans. The colony size varies from 5 to 30 cm of height.

This shade-tolerant species is found in fissures, caves and below steep cliffs of rocks and coralline

Occurs from the surface down to 100m of depth, more generally observed around 40m.

The growth rate of this species is low, about 2 to 8mm per year.

The skeleton of red coral is intensively searched for more than 2000 years mainly for the jewel market; divers risk their live to collect it. This animal is heavily targeted mainly in Corsica, Sardinia and Tunisia; its processing industry is mainly located close to Naples in Torre del Greco.

Qu'est-ce que le réseau **MedPAN** ?

*What is the **MedPAN** network ?*

MedPAN est le **réseau des gestionnaires d'aires marines protégées de Méditerranée.**

Ce projet d'une durée de trois ans (2005 - 2007) est financé par l'initiative Interreg IIIC zone Sud. Il rassemble 23 partenaires de 11 pays du pourtour méditerranéen, dont 14 partenaires européens (France, Italie, Grèce, Espagne, Malte, Slovénie) et 9 partenaires de pays non européens (Maroc, Tunisie, Algérie, Croatie, Turquie).

Ces partenaires gèrent plus de 20 aires marines protégées et travaillent la création de plusieurs sites.

Le réseau a pour objectif de faciliter les échanges entre aires marines protégées méditerranéennes afin d'améliorer l'efficacité de la gestion de ces territoires.

En particulier, le réseau permet de :

- promouvoir le partage d'expériences et de bonnes pratiques entre gestionnaires ;
- proposer des solutions aux problèmes de gestion des aires marines protégées ;
- améliorer les compétences des gestionnaires ;
- faire connaître le rôle des aires marines protégées et favoriser leur reconnaissance ;
- diffuser des messages communs à l'ensemble des aires marines protégées.

Le réseau organise plusieurs **ateliers thématiques** chaque année sur des problématiques de gestion communes à l'ensemble des aires marines protégées.

Le réseau finance la réalisation d'**études**.

Le réseau a pour vocation de produire des **outils méthodologiques** destinés à aider les gestionnaires dans leur travail quotidien.

Le réseau publie également le **Répertoire global des aires marines protégées de Méditerranée.**

*MedPAN is the **network of managers of marine protected areas in the Mediterranean.***

This three-year project (2005 - 2007) is funded by the Interreg IIIC zone South initiative. It brings together 23 partners from 11 countries around the shores of the Mediterranean, of which 14 partners are European (France Italy, Greece, Malta, Slovenia, Spain) and 9 partners from non-European countries (Morocco, Tunisia, Algeria, Croatia, Turkey).

These partners manage more than 20 marine protected areas and are working towards the creation of several new sites.

The aim of the network is to facilitate exchange between Mediterranean marine protected areas in order to improve the efficiency of the management of these areas.

Specifically, the network can :

- *promote the sharing of experiences and good practices amongst managers ;*
- *suggest solutions to management problems of marine protected areas ;*
- *improve the capacity of managers ;*
- *make the role of marine protected areas known and encourage their recognition ;*
- *disseminate messages common to all marine protected areas.*

*The network organizes several **thematic workshops** each year on management issues common to all the marine protected areas.*

*The network finances the carrying out of **studies**.*

*The purpose of the network is to produce **methodological tools** designed to help managers in their daily work.*

*The network also publishes the **Global directory of marine protected areas in the Mediterranean.***

www.medpan.org

Le réseau MedPAN est coordonné par le WWF-France
The MedPAN network is coordinated by WWF-France

WWF *pour une planète vivante**

** for a living planet®*

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