FACULTY OF THE ENVIRONMENT
UNIVERSITY OF THE AEGEAN

POTENTIAL ESTABLISHMENT OF MARINE PROTECTED AREAS & DEVELOPMENT OF DIVING TOURISM IN THE ISLAND OF LESVOS (NE AEGEAN SEA)

FINAL REPORT

MYTILENE

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EXECUTIVE SUMMARY

The establishment of a Marine Protected Area (MPA) with the role to *conserve the biological diversity and productivity of the oceans* has been recently proposed that can additionally provide important economic revenues and development, in a local or national scale, through touristic activities or the replenishment of fisheries. Moreover it can contribute to the protection of historic and cultural features of an area, provide opportunities for educational activities and constitute field for scientific research.

A number of key-steps for the establishment of a MPA, potential financial sources for the running costs and disciplines for management are proposed by the present study. In any of the above stages, the involvement and support of the local community is a fundamental factor.

The Hellenic Republic, as a member state of the European Community, has adopted measures for the protection of the environment (e.g. Habitats Directive 92/43/EEC). Recently, the new Law of the Hellenic Government regarding recreational diving aims to position Hellas into the world's SCUBA diving industry and to enforce alternative types of tourism in the country.

Lesvos Island (NE Aegean) is visited annually by a big number of tourists. Belonging to the Prefecture of Lesvos, along with Limnos and Agios Efstratios islands, they host many protected areas of the NATURA 2000 Network and the Petrified Forest of Sigri which is a Natural Monument and Geopark. Moreover, oceanographic surveys of the Department of Marine Sciences (University of the Aegean) have revealed that marine areas off the island of Lesvos host great biodiversity and constitute suitable areas for potential development of organized diving tourism.

During the last years there has been observed an obvious increase of SCUBA diving activity and tourism in Lesvos as a result of the attempts made in order to develop the policy of the environmental orientated 'green' tourism in the Prefecture.

Following the current trends according to the global gained experience, it is proposed by the present study to investigate the establishment of a Network of MPAs in the NE Aegean, where recreational activities will be harmonically developed along with the principles of environmental protection and conservation

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WORKING GROUP

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A. Introduction – What is a Marine Protected Area?

Reportedly to the World Conservation Union (IUCN) a "Protected Area" has been defined as:
"An area of land and/or sea especially dedicated to the protection of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means".

Furthermore, there has been developed by IUCN a compatible definition of a "Marine Protected Area" (MPA) as:
"Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment"*.*

There are different types of MPAs including marine parks and reserves or any locally managed area that protect marine and coastal habitats such as reefs, seagrass beds, wetlands, underwater areas close to the coast or in the open sea as well as the water column or even cultural landmarks like antiquities or shipwrecks.

In 1988, national governments, international agencies and NGOs were called by the World Conservation Union (IUCN) General Assembly to:
"Provide for the protection, restoration, wise use, understanding and enjoyment of the marine heritage of the world through the creation of a global, representative system of marine protected areas and through management in accordance with the principles of the World Conservation Strategy of human activities that use or affect the marine environment".

Recently, the importance of the establishment of MPAs in combination to the conservation and sustainable use of the marine environment and resources is highlightened in many parts of the world. As of 2006, at least 4,500 MPAs existed worldwide, covering some 2.2 million km^2 or approximately 0.6% of the ocean. Of all those MPAs, only a small number are marine reserves, which receive complete and permanent protection. Less than 36,000 km^2 of the ocean, or 0.01%, is currently protected in marine reserves.

There are two broad approaches to creating a MPA system: (a) establishing a series of relatively small marine protected areas as part of a broader framework of integrated ecosystem management or (b) establishing a large, multiple zone marine protected area encompassing a large part of a marine ecosystem.

Picture 1: Marine Protected Areas in the Mediterranean Sea.

B. Main Purposes for the Establishment of MPAs

Currently to the technological progress, anthropogenic activities and impacts to the marine environment have increased notably. As mentioned previously it has been widely recognized that it is essential to provide the conservation and rational management of the oceans and its resources.

According to the existing bibliography the main goal for the establishment of MPAs is to safeguard nature through the protection of particular species (e.g. the Mediterranean Monk Seal), threatened environments and the biodiversity which the latter support. According to IUCN the role of MPAs is: *"to conserve the biological diversity and productivity (including ecological life support systems) of the oceans"*.

However, recently the purposes for the creation of MPAs have "expanded" as they can provide important economic revenues and development in a local or national scale through touristic activities or even the replenishment of fisheries.

B.1. MPAs and the Protection of the Marine Environment and Biodiversity

Some of the many changes to coastal and marine ecosystems take place on a time-scale that makes it hard to realise its nature, extent or magnitude. Very often the significance of biological diversity and ecosystem processes is only appreciated after they have been lost or damaged.

Thus, without taking measures such as MPAs and 'no-take' reserves, biodiversity is likely to be lost before we know of its existence or importance for humanity, or how it should be managed for long-term sustainability.

The most immediate benefits of MPAs are that they provide natural areas with lower anthropogenic impacts. Most species and biological communities have evolved some capacity to survive or recover after periodic stresses such as high or low salinities, temperatures or severe storms. For example, research into high temperature-induced coral bleaching suggests that corals from areas with low stress from human activities have a higher capacity to recover and are less likely to suffer or be killed by extreme coral bleaching.

Maintaining representative samples of marine ecosystems in intact condition, aiming for them to be self-sustaining and able to adapt to incremental changes in climate, is a prudent investment for the future. Furthermore, maintaining a comprehensive 'gene pool' of marine species, covering their natural ranges of populations and their vital functions, will help ensure the broadest possible variety of biodiversity options for the future.

Finally, reserves with undisturbed biological diversity and ecosystems are particularly critical in the search for effective methods to mitigate damage and restore damaged ecosystems. Without biodiversity reference areas it is difficult to study and assess the outcomes of restoration attempts or improve past performance.

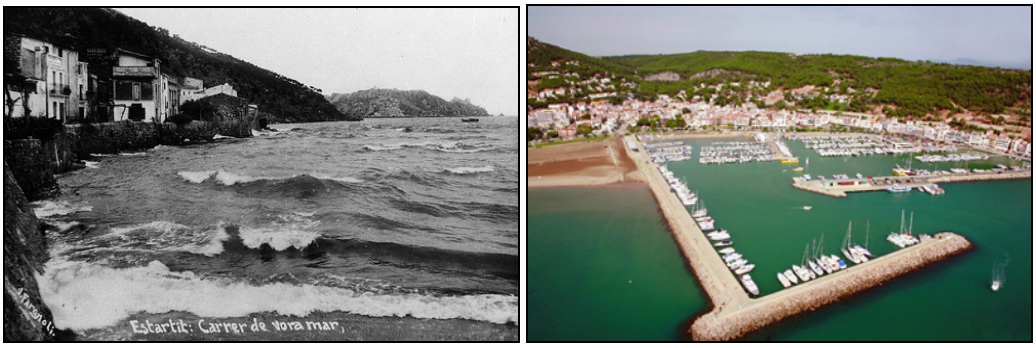
B.2. MPAs and Tourism

Tourism is a major source of income for many developing countries in all over the world. Its revenues frequently exceed those from the fishing industry.

For instance, in **Australia** the Great Barrier Reef attracts about 1.8 million tourist visits with the industry valued at over A$ 1 billion per year, in comparison to estimates of A$ 359 million for the annual worth of Great Barrier Reef fisheries.

According to the global experience and practise, the establishment of a MPA is an excellent way to raise the profile of an area. The development of marine tourism (e.g. boat tours, SCUBA diving, snorkelling, sailing, recreational fishing) and the creation of new facilities (e.g. marinas, hotels, restaurants, environmental education centres) can broaden local economic options and create new job positions facing the critical problem of unemployment.

As an example, economic activities in **L'Estartit (Spain)**, the small village on the mainland opposite the Medes Islands, are exclusively related to marine tourism in the islands. These include diving centres, hotels, restaurants, snorkelling tours and glass-bottom boats. In 1996, 10 of the diving centres operating in the area, occupied 125 employees and 17 boats with a total capacity of 725 passengers (each diving boat also containing an auxiliary pneumatic boat), representing an investment of US$3.6 million. It has been estimated that all this economic activity represents a direct income of about US$7 million per year. In the same time, there has been observed a reduction in the seasonality of tourism when compared to other tourist resorts in the area.



Picture 2: The coastline of the small village L'Estartit (Spain) in the past and today.

Scuba diving is an increasingly lucrative element for tourism in the Mediterranean Sea; particularly during the last years as a result of technical progress in the equipment and interest growing for nature, conservation and environmental problems. The interest of divers for MPAs 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. Biological and ecological consequences of the protection measures could attract many divers who come not only in the protected zone but in the adjacent areas as well. The many economic surveys indicated that the MPAs generated an important underwater tourist industry. Moreover, even when 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.

B.3. MPAs and Fisheries

MPAs which include core 'no-take' reserves could play an important role in arresting and possibly reversing the local or global decline in fish populations and productivity. The global fish catch is reported to be in decline since the late '80s. Indications of this decline include:

- fishing for smaller and lower-value species;
- having to fish further from home bases; and
- the destruction or degradation of fish habitats in coastal areas.

In the face of increasing world population, reversing the decline and maintaining the high quality protein supply from the sea will require considerable improvement in the management of wild capture fisheries, aquaculture and the health of the ecosystems upon which they depend.

There is a substantial weight of evidence in favour of the beneficial role of MPAs in a range of different types of fisheries, in different places worldwide, and within different fisheries management regimes. MPAs on their own are not sufficient as a single management tool, except possibly in small-scale subsistence fisheries where other management systems may not be very effective.

For fisheries, MPAs generally can be considered to provide the following main basic benefits:

- support for stock management, including:
    - protection of specific life stages (such as nursery grounds);
    - protection of critical functions (feeding grounds, spawning grounds);
    - provision of spillover of an exploited species; and
    - provision of dispersion centres for supply of larvae to a fishery.

- improved socio-economic outcomes for local communities;
- support for fishery stability; and
- ecological offsets
    - trade-off for ecosystem impacts; and
    - better understanding of impacts and options.

Traditional measures for the management of fisheries that have been used widely till today include seasonal and spatial restrictions of fishing grounds, limitations on the type and characteristics of fishing gear or on the number of people allowed to fish.

There is often conflict between fisheries and MPAs even though the last can provide benefits to both fisheries and conservation. A number of studies from MPAs with 'no-take' reserves established in overfished coastal and island areas show a significantly improved fish catch and have finally led to sustained catch levels.

As an example, local captures have improved by 50-80% in only 8 years in **Tabarca Marine Reserve** and in **Medes Islands** (Spain). This fact has also been documented in numerous fisheries reserves (*'cantonnements de pêche'*) in **France**.

B.4. MPAs and Culture, History and Heritage

Another important role of the MPAs is to inform local communities and visitors about the culture, history and heritage of the areas they protect. In most coastal areas and especially in the Mediterranean countries, there is a history of use, culture and values associated with specific localities in the marine environment. There are often links to prehistoric use, myths and legends, and traditional practices of use that are important in the understanding of present values or future options.

Today governments and local communities in some countries are protecting these sites of historic, cultural, and religious significance through the declaration of various forms of MPAs. For instance, some historic and cultural MPAs are declared to fulfil a single purpose, such as protecting a submerged cultural resource site from amateur souvenir hunters or professional salvagers, or to protect a single marine species from exploitation. Other MPAs are created within a multiple-use approach that includes the protection of historic and cultural features as well as biodiversity, conservation and sustainable use.

Educating visitors about sites of historic significance helps illustrate the relationship between humans and the marine environments. These sites can include shipwrecks, lighthouses, battle sites, hunting and collecting areas, ceremonial and sacred sites, fish traps, harbours, coastal fortifications, fish markets, fish smokers, salting and drying sheds, sail lofts, old ships, small boats etc. Such sites are also important for developing local understanding of rights and responsibilities in using and caring for marine environments.

Picture 3: The 19th century Miramare Castle is situated in the Miramare Natural Marine Reserve (Gulf of Trieste, NE Italy).

MPAs with a cultural component can also include trans-boundary MPAs, established where two or more adjoining protected areas are situated between adjacent countries and managed cooperatively. 'Parks for Peace' are trans-boundary protected areas that are formally dedicated to the promotion of peace and cooperation, the protection and maintenance of biological diversity, natural and associated cultural resources. Trans-boundary MPAs are particularly important in areas where a single marine ecological unit is shared by the jurisdictions of two or more countries. Where there is a history of rivalry or conflict between adjacent nations, the conservation of a shared resource can be an important step in building mutual understanding and cooperation.

In 1994, **Jordan** and **Israel** agreed to develop a ***Binational Red Sea Marine Peace Park*** within the framework of an Agreement on Special Arrangements for Aqaba and Eilat. The Agreement calls on the parties to *'collaborate in research efforts on coral reefs and marine biology, and in implementing comparable policies and regulations designed to protect the coral reefs as a tourist attraction which is soundly managed from an ecological point of view'.*

B.5. MPAs and Educational Activities

Marine protected areas are particularly important because they provide opportunities for people to experience and study marine plants and animals that are undisturbed by fishing and other anthropogenic impacts. They can thus become places where people can observe and compare with the impacts from disturbance.

Education centres and trained education staff based around MPAs have an important role in helping children and older students learn how fish and other marine animals find food, hide from predators, grow, reproduce, migrate or defend their territories. As children learn and share their knowledge with their families and the wider community, they play a significant role in developing community understanding and demand for sustainable management of their marine environments.

Repeated field surveys by student classes over many years can provide information about long-term change that cannot be obtained in any other way. Participants in these activities are also more likely in later years to be informed contributors to future decisions about marine environments and resources.

For instance, at **Miramare Natural Marine Reserve** (Italy) courses in marine biology at different levels (primary, secondary, and university undergraduate and postgraduate) are held. There is a visitor centre and research activities are conducted at the marine laboratory and at the nearby CNR Institute. Every year 7,000 students, ranging from the primary school children to the university students, attend Miramare laboratories and seashore areas dedicated to environmental educational activities. Lots of school groups come from all over the regional territory, but there are also good numbers of students (40% of the total amount) that come to visit Miramare Marine Environmental Education Centre (C.E.A.M.) from the rest of the country. Approximately 145,000 tourists had visited the Reserve between 1990 and 1995.

A further important educational role of MPAs is the training of resource management staff. Typically most staff comes from backgrounds with little exposure to the nature and values of marine plants, animals and ecological processes. Courses at MPA field stations can provide a valuable introduction and contribute to the understanding of these values. Marine protected areas with education facilities also play an important

role in tourism through providing training, support and information for local people involved in the tourist industry.

Picture 4: Environmental Education activities at Port-Cros National Park (left) and Medes Islands Protected Area (right).

B.6. MPAs and Research Activities

As far as MPAs protect representative samples of biodiversity, they can be used as reference sites in long-term research. This may involve the understanding of marine ecosystems and their services, developing and evaluating techniques for sustainable management and exploring options for new forms of use. Sustainable use of marine resources requires detailed knowledge of the oceans' biodiversity. No-take' reserves provide a crucial means for establishing reference points to assess human and other impacts on adjacent marine environments.

Recently, there has been a special emphasis on developing more sophisticated tools for observing and measuring the physical, chemical and biological characteristics of the oceans. The development of new ocean technology depends, to some extent, on the availability of areas where trials can be conducted free of interference from other impacts and where there are normal ocean biological conditions.

C. Legal Status of MPAs

All areas eligible to be declared as MPAs **must be awarded a legal status** guaranteeing their effective long-term protection. Each nation, and inside them each autonomous region, must have a legal coverage and applicable regulations for protected areas and also for endangered species. For example, in Spain, there are national and regional laws for conserving nature heritage and natural areas.

In practice there is a wide range of types of MPAs. They include MPAs which are run by government agencies; set up and operated under collaborative management systems; set up under customary tenure; managed on a voluntary basis; based and run by a local community.

European nations have International Conventions and EU Directives for habitats and species protection such as:

- The **1976 Barcelona Convention** for Protection against Pollution in the Mediterranean Sea is a regional convention to prevent and abate pollution from ships, aircraft and land based sources in the Mediterranean Sea. Signers agreed to cooperate and assist in dealing with pollution emergencies, monitoring and scientific research. The convention was last amended in 1995, including the **Protocol** Concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA Protocol). It presents a list of endangered or threatened species as well as suggestions for the establishment of 'Specially Protected Areas of Mediterranean Importance' (SPAMI).
- The **Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979),** also known as the Bern Convention, which provides for the monitoring and control of endangered species.
- The **Birds Directive** (formally known as Council Directive 79/409/EEC on the conservation of wild birds) was adopted in **1979 by the EU**. It aims to protect all European wild birds and the habitats of listed species, in particular through the designation of Special Protection Areas (SPA).
- The **Habitats Directive** (formally known as Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora) was adopted **in 1992**. It aims to protect some 220 habitats and approximately 1000 species listed in its Annexes. The directive led to the setting up of a network of Special Areas of Conservation (SAC), which together with the pre-existing Special Protection Areas (SPA) from the Birds Directive, form a network of protected sites across the **European Union called NATURA 2000.**

D. MPAs and the Local Community

The establishment of MPAs can also have social impacts on local communities, which can accept or reject the MPA idea, but should in any case be involved in the

planning and realization of MPA projects from a very early stage. In many MPAs outside of the Mediterranean, the success of protective initiatives has often been found to be proportional to the degree of involvement of the local community. Although the involvement of the local community is pertinent in every MPA, an important distinction should be drawn between MPAs in wealthier areas belonging to industrialized countries, or industrialized parts of countries, and those in developing countries, or underdeveloped areas of countries. The economic revenues from many MPAs may be more easily exploited by the local community when the MPA is located in a more developed area than when it is in a less developed one. This could be the case in, for example, the development of a diving centre, which, at least during the first few years, is managed by people from outside the MPA who possess the skills and resources (specialist diving qualifications, vessels, photographic equipment) to organize and direct the business. These parameters should be treated separately, and a strategy adopted which addresses as much the social and cultural spheres as the economic objectives.

Fishermen are usually the first group from the local community, to be affected from the establishment of a MPA. In fact they could provide valuable contributions through their knowledge of the area, assisting in the choice of the most suitable site to be protected and providing useful information for its successful management. Thus in **New Zealand**, despite the initial opposition of fishermen to the establishment of the Leigh Marine Reserve, 78% later supported the implementation of **additional MPAs**.

E. Key Steps in Establishing a MPA

Based on the large accumulated experience on MPAs worldwide, a number of key steps for the establishment of a MPA can be identified:

- Choosing the area to be protected according to a number of different criteria (e.g. environmental features, biodiversity, existence of endemic or threatened species and habitats, socio-economic and cultural criteria).
- Understanding the area by using a multidisciplinary approach which includes all the different environmental and socio-economic aspects.
- Creating a formal joint project team with clear leadership and representatives from the key stakeholders.

- Discussing project and options with the local authorities, decision makers and associated groups (e.g. fishermen unions, diving centres)
- Raising the public awareness through the use of different means and tools (e.g. open dialog, leaflets and brochures, posters, educational exhibitions and presentations). It is important to note that it is not the politicians who will take decisions but it is the people who are going to press politicians to take action.
- Entering the legal process (depending on the local legal framework): writing of the formal proposal for the establishment of a Protected Area to the relevant Ministries (e.g. Ministry of Environment, Physical Planning and Public Works; Ministry of Mercantile Marine, The Aegean and Island Policy) with the support of the local authorities and society.
- In parallel, financing further studies (e.g. Environmental Impact Study, Socio-economic studies) by the relevant Ministries, local authorities etc.
- Establishing the Marine Protected Area.
- Creating a successful Management Body, responsible for the management, monitoring and surveillance of the Protected Area.
- Searching support and funding by the relevant Ministries, European, Regional and local authorities or other sources (e.g. private companies, NGOs such as WWF). Furthermore, applying to the relevant European or Regional Programs which support this kind of efforts (e.g. participation in the MedPAN Network) and cooperation with relevant organizations, institutions and foundations.

It is important to notice that the row of the above key steps for the establishment of a MPA may differ from place to place, depending on the current situations and the local legal framework.

Picture 5: Meetings with the stakeholders for the establishment of Kaş-Kekova SPA (left) and WWF buoys located to warn divers of sensitive sea grass habitats in the marine area.

The Kaş-Kekova Special Protected Area (Turkey)

The marine area of Kaş-Kekova is one of the two most popular diving sites in Turkey. Kaş-Kekova is a Nature Protection Area, an Archaeological Protection Area and one of the 9 Special Protected Areas (SPA) along the Aegean and Mediterranean coast of Turkey, protected by the 'Lycian Coast project' which was proposed by WWF Turkey and designed in partnership with the WWF Mediterranean Programme Office. Additionally belongs to IUCN's Management category IV (protected area managed mainly for conservation through management intervention). WWF Turkey's strategy is to create new MPAs based on their 'marine species richness' value to safeguard selected sites. Cooperation was established along with the Authority for SPAs. The project was presented to all ministries, local governments and municipalities having jurisdiction on the coastal and marine habitats (Ministry of Environment and Forestry, Min. of Culture and Tourism, Min. of Agriculture, Min. of Construction, Undersec. of Maritime Affairs, Coast Guard etc).

The survey in the Kaş-Kekova marine area was conducted with the cooperation of WWF Turkey and the Bosphorus University Diving Club. In total, 33 divers covered 78 km in 672 dives between July and September. Free dives at depths 0-6 m and scuba dives at 18-38 m were made. Species were selected according to their status of threat and protection, by international conventions or under the National Fisheries Manual and their presence in the survey area.

A wide range of consultations were made with various stakeholders groups such as Central government and Regional authorities, Coast guard, Academicians, Municipalities, Hotels and pensions' owners, Fishermen, Aqua culturists, Diving clubs etc. The cooperation between 11 diving clubs and the local administration aimed towards the funding of the project, the selection of sites, the mapping and the setting up of the buoy systems and the increase of the awareness through national and international media and the communication activities in general.

The first step was the proposal to enlarge the Kekova SPA in order to include the Kaş area. The proposal was sent to the Authority for SPAs, supported by strong documentation coupled with GIS maps. The presentation was made at the Authority for SPAs Headquarters. The proposed concept was pre-approved by the Authority and endorsement request was sent to 13 different authorities with jurisdiction over the area. Three years and many meetings later Kaş-Kekova SPA was officially declared by the Council of Ministers and published in the Official Gazette. Even if the area doesn't have a management plan for the marine part, it has a management plan for the coastal part, and the marine part is regulated by the Fishing law, which depends on the Ministry of Agriculture.

F. Financing MPAs

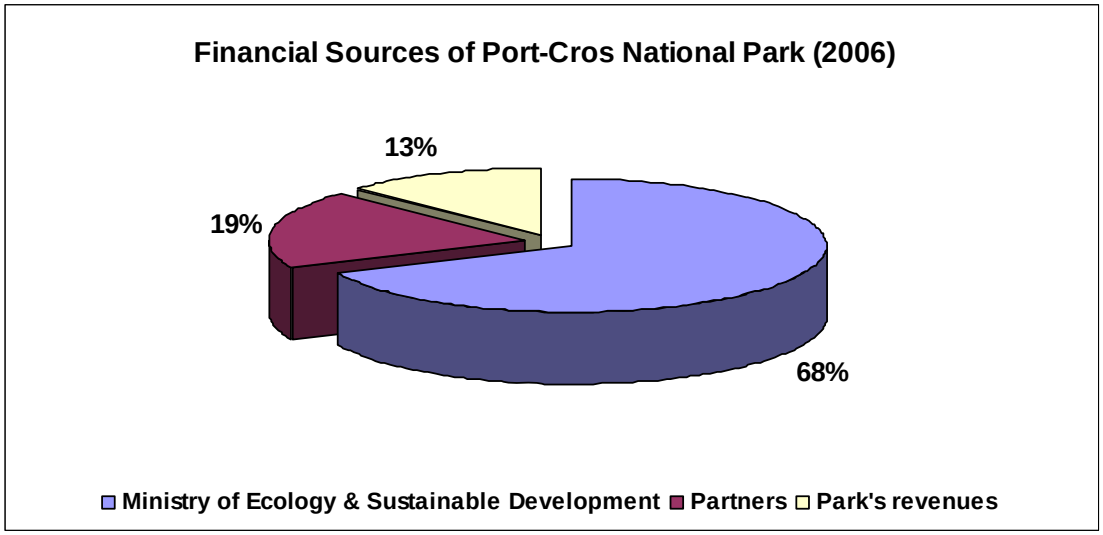
Budgets differ considerably from one MPA to another. In general, MPAs require expenses between € 50 and € 1000 / hectare / year, depending on the size, intensity of protection measures, surveillance and visitors' control needs, research activities, and sharing of management responsibilities. Broad Marine Fisheries Reserves with no visitors, are patrolled and surveyed with approximately 5 to 10 €/ha/year.

The majority of Mediterranean MPAs have so far been unsuccessfully financed from public funds. States have failed to sufficiently finance running costs, with the inherent risk of MPAs not being sustainable projects over time. It is important therefore for the MPAs to develop a long term financing plan with varied sources of financing.

- Part of the revenue could be generated through market-related mechanisms such as entrance fees, concessions, recreational activity permit fees, diving fees, hotel room surcharges, resource extraction fees, and the most important of all, the payment for ecosystem services.
- Complementary, financing for MPAs should be obtained from local (e.g. prefectures, municipalities), national (e.g. relevant Ministries) and European authorities as well as contributions from private companies and NGOs (e.g. WWF).
- In the special case for the restoration of environments which have been damaged following an accident, funds should be obtained from insurance companies (offsets from environmental impact).
- Cooperation and exchange of experience between different MPAs (within the country or not) can contribute to setting up international financing projects for several MPAs and provide administrative and financial coordination.
- It is important to develop economic assessments, demonstrating and quantifying the MPA's economic value; developing mechanisms for equitable sharing of costs, and benefits from MPAs and widely disseminate their results in order to improve support given to MPAs by decision makers.

Port-Cros National Park's (S. France) revenues for 2006 came up to 5.080.501 € and were financed, as seen in the following graph (Pic. 6) from the French Ministry of Ecology and Sustainable Development; Partners (Region, Prefecture, Community of Municipalities, Total Foundation, Municipality of Hyéres, WWF, Groupe d'Etude du

Mérou, Diving Clubs) and finally the Park's market related revenues (publications, exhibitions, entrance and diving fees and rents, guided tours, hotels, taxes etc.).



Picture 6: Financial sources of Port-Cros National Park (2006) for 2006.

G. Planning and Managing the MPA

Management planning for a MPA involves assessing and recording the conditions of a site, evaluating current and projected needs and threats, and developing strategies and planning specific activities designed to address those threats. MPA management plan should be considered as a dynamic technical document rather legal instrument. As such it has to be updated at regular intervals so to adjust to changing conditions. Planning in general should not be done in isolation by an individual, but rather should involve internal as well as external stakeholders.

The term 'collaborative management' or 'co-management' is used to describe a situation in which some or all relevant stakeholders in an MPA (usually the local community) jointly manage the MPA with the conservation agency that has jurisdiction over it. Co-management is a flexible concept because there are many social contexts in which participation in management takes place, with different time scales, actors, processes and results.

It is equally possible for a conservation agency to manage the MPA itself, but invite views and opinions from the local community in a friendly and participatory way. Or, more often, co-management may be possible for some sectors but not for others. For

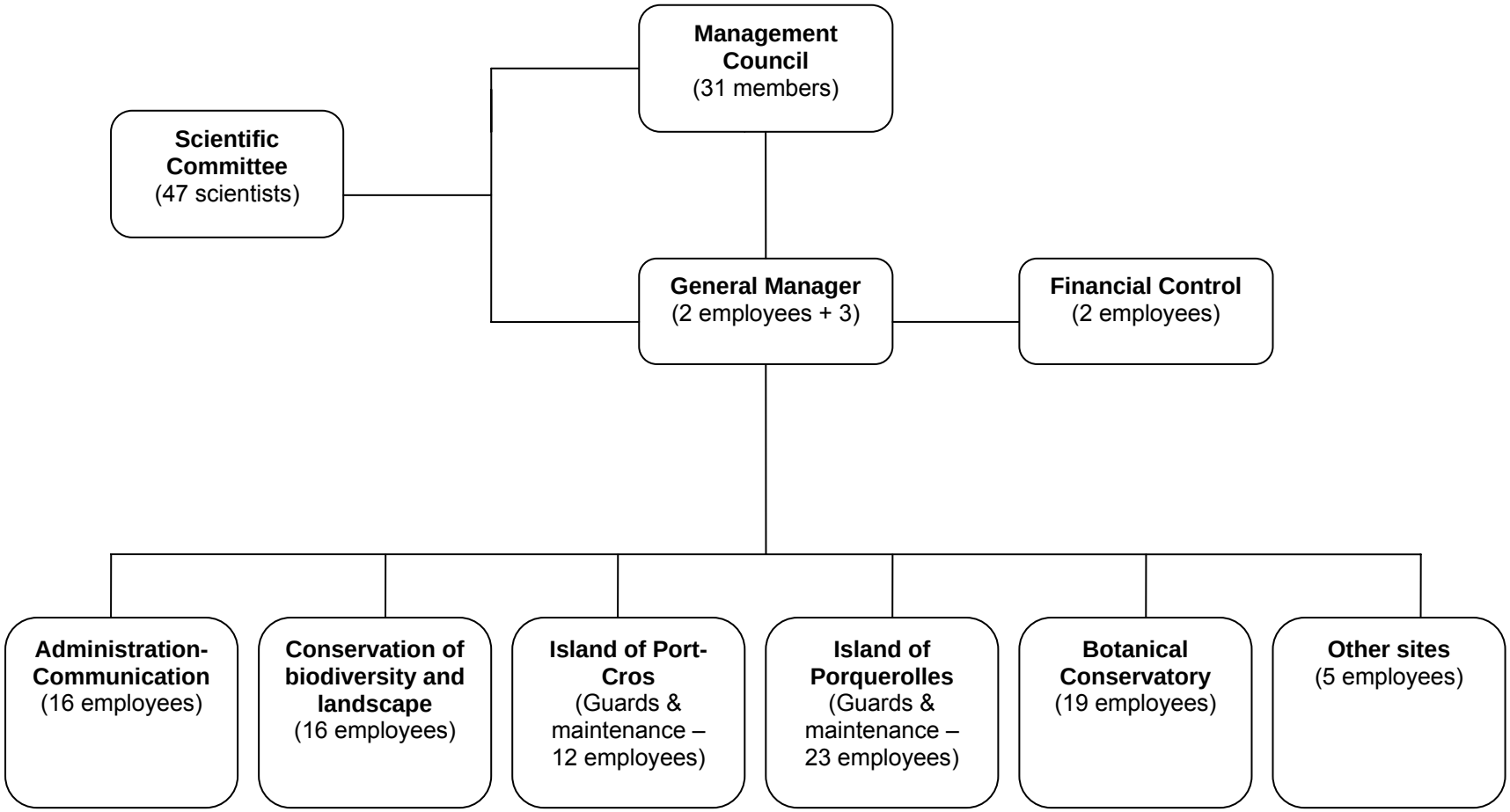
example fishing rights and tourism access in a MPA could be co-managed but control of navigation rights might have to remain with a government authority.

Co-management is a subject of growing interest and has many benefits. It legitimizes community involvement and respects its need for socio-economic development and use of their traditional rights, while maintaining government interest and concern for the MPA. It is likely to lead to a reduction in management costs, especially of enforcement and monitoring. Most important, perhaps, it is likely to make the MPA far more sustainable in the long term.

Management should be responsive and adaptive, working with local interests in a way that builds support for the conservation objectives. To achieve this, managers should adopt a systems approach, use interdisciplinary teams and follow a clear sequence of decision-making. Most MPA management is about managing human activities, so this must be at the heart of the approach.

Port-Cros National Park (S. France) is a public establishment under the authority of the French Ministry of Ecology & Sustainable Development. The park is managed by a Council in which local authorities, inhabitants, associations, organizations and the Ministry is represented. The Board is consisted of 31 members and it convenes twice a year to define the management principles, set the key initiatives, vote for the budget and control the action of the General Manager and his team. Apart from the Management Council and the 47 Scientists of the Park's Scientific Committee, Port-Cros National Park has totally 98 employees, 50% of which are full timers.

Picture 7: Port-Cros National Park and Porquerolles National Mediterranean Botanical Conservatory Organization Chart



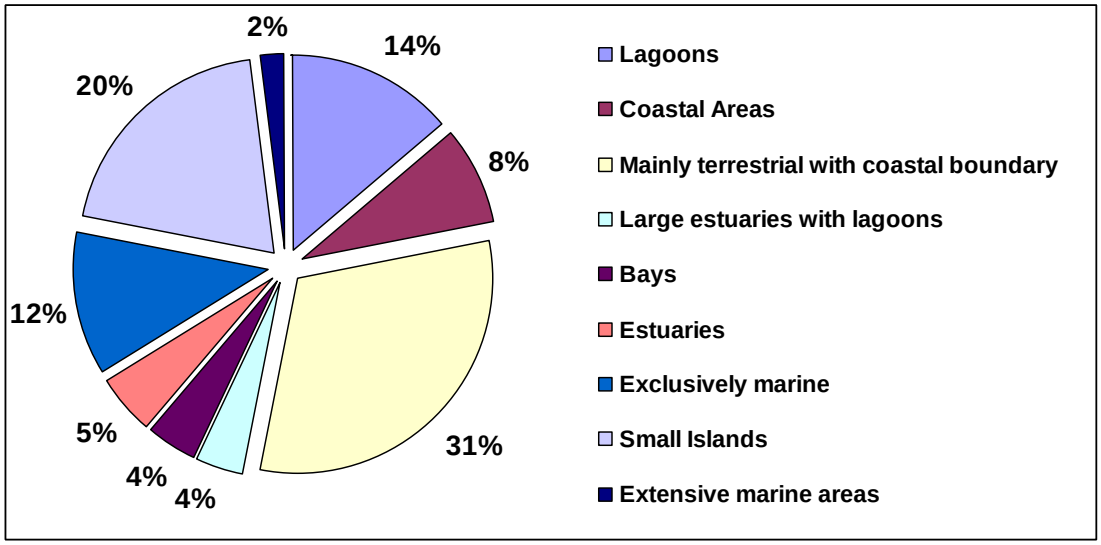
H. Protection of the Marine and Coastal Environment in Greece

The earliest measures taken in Greece, to conserve elements of the coastal and marine environment included restrictions on the use of certain fishing gear such as the otter trawl, in enclosed bays and inshore waters, and the ban on destructive fishing methods like the use of dynamite. The first piece of legislation that included measures to protect marine species was the 1981 Presidential Decree 67/1981 that included 8 invertebrates, 12 fishes, 3 reptiles and 5 mammals. Greece also ratified in 1983 the Bern Convention that included a number of marine species (32 invertebrates, 25 fishes, 3 reptiles, 13 mammals and a large number of waders and marine birds).

The first Protected Area that was set aside in 1992 mostly for the protection of the marine environment was the National Marine Park of Alonnisos – Northern Sporades, where a large number of critically endangered Mediterranean monk seals (*Monachus monachus*) live. In 1999 another National Marine Park was established in Zakynthos, mainly in order to conserve the nesting beaches of the loggerhead turtle (*Caretta caretta*).

A major breakthrough in the protection of marine and coastal areas in Greece came with the provisions of the 1992 EC HABITATS Directive. One hundred and eleven out of the 239 sites (44.6 %) that were proposed by Greece as Sites of Community Interest (SCI) include marine habitat types. In addition, 8 sites that do not include any marine habitat should be taken into account as they contain sea cliffs and sea caves that are important for marine animals such as the Mediterranean monk seal. About a dozen more sites, not included in the SCI list, which are important for marine birds were included in the list of Special Protected Areas (SPA) of the EC Birds Directive. In most cases, the marine part of the protected sites extends offshore to a depth of 50 m, which is considered as the usual lower limit for the distribution of Mediterranean endemic Posidonia beds. The relative majority (31%) of the sites with a marine component have been designated primarily because of their terrestrial importance. Thus, the marine area contributes only slightly to their total area. Another significant number of sites (20%) contain all or most of the terrestrial part of small islands of the Aegean and the Ionian seas as well as the surrounding marine environment. Of the remaining sites, lagoons and estuaries are transitional ecosystems leaving only a small number of sites designated especially for the

protection of the marine environment, e.g. coastal areas (8%), exclusively marine sites (12%), bays (4%) and extensive marine areas (2%). The latter are represented by the National Marine Park of Alonnisos – Northern Sporades in the north Aegean (220,000 ha) and the inner archipelago of the Ionian Sea (88,000 ha). Although sites with a marine component are equally distributed all over continental and insular Greece, there is a clear geographical differentiation between the above categories: large lagoons and estuaries are mostly found in northern continental Greece



Picture 8: Proposed Sites of Community Interest with a marine component (N = 111) according to the objective of protection.

Seven habitat types belonging to the 'Open Sea and Tidal Areas' category of the Habitats Directive have been recorded so far in Greece. The habitat type of 'Submerged or partly submerged sea caves' must also be included. By far the most frequent habitat type encountered in SCI areas is the 'Posidonia beds' followed by 'Reefs'. With the exception of the two National Marine Parks, management measures for the remaining sites are now starting to be implemented. Only recently (mid 2003), the Boards of the Management Agencies, were established by the Greek Ministry of Environment in 27 NATURA 2000 sites, 14 of which are of marine importance. The Boards will work closely with the local authorities, competent Ministries, NGOs and other stakeholders in order to ensure the proper management of the sites. Objectives relevant to the marine environment include the control of visitors on the beaches, eco-tourist activities, public awareness, management of marine natural resources and control of pollution threats, law enforcement, monitoring and promotion of scientific research.

The existing legislation for the conservation of marine species in Greece includes the Presidential Decree 67/1981, the EC Habitats Directive 92/43, the Bern Convention, Bonn Convention on the Conservation of Migratory Species of Wild Animals and the Convention on International Trade of Endangered Species (CITES). The Protocol of the Barcelona Convention concerning Specially Protected Areas and Biological Diversity in the Mediterranean is also relevant; however, Greece has not yet ratified it. In general, 261 animal (of which 150 are birds not included herein) and 11 plant species are under some type of legal protection. In recent years, several assessments of the conservation status of Greek marine species have been carried out by international organisations such as IUCN, and by Greek and foreign researchers. It is evident that many threatened species are not protected by legislation, a fact that actually applies for all the Greek fauna. In addition, the population status for the majority of the protected species is not sufficiently known. The major constraints in applying legislative measures include the lack of public awareness and of appropriate training of the competent authorities (Thessalou-Legaki & Legakis, 2005).

I. Diving Tourism in Greece: Status, Definitions and Restrictions

The new Law 3409 regarding recreational diving in Greece, prepared by the Ministry of Mercantile Marine is the outcome of the Hellenic Government's Strategic Plan for positioning Greece prominently into the world's SCUBA diving industry, and for the enforcing of alternative tourism in the country.

The Law is in fully accordance to the EU Standards regarding recreational diving, which have actually been in force since early 2004. Moreover the unreasonable restrictions imposed in the past by archeologists are now being successfully modified and the concept of Diving Parks has been firmly established. Notably, the legislative framework provides adequate protection of the environment, ensures the appropriate respect for precious underwater antiquities, as well as the safety and adequate professional skills of the divers. The Hellenic Republic has several advantages as a diving destination like safety as EU member, short flight distances for European travelers, excellent climate and long diving season, same currency with many other EU countries, and other amenities.

Further down specific Articles of the Law 3409 are shortly presented.

Articles 3-10:

- An accreditation system consonant to EU directives is established for the Scuba Divers' Training Programs, for the appropriate certification of various Diver Training Organizations, as well as for the Diving Services Providers. Moreover, Diving Services are classified according to their type, they are certified on an individual basis by an accredited products certification agency and each of them will be licensed by the competent Port Authority. There are now clear requirements as specified by law, to the effect that only those holding the necessary license will be able to provide Diving Services.

Specifically, the most important clarifications about the restrictions concerning diving are (Article 11):

- Recreational diving is permitted everywhere except from:
  - The defined – from the Ministry of Culture – submarine archaeological sites. In case there is a common decision between the Ministers of Culture and of Mercantile Marine, some of these sites could be characterized as submarine museums and be visited only with the escort of a guard diver.
  - Particular vulnerable marine ecosystems reportedly to specific Laws.
  - Marine Protected Areas whose administrative authorities impose prohibitions.
  - Defined areas and places for avoiding hazards (e.g. ports).
- Scuba divers are not allowed spear fishing and any other kind of fishing (which also stands for the boats that accompany them) or collecting and disturbing any kind of marine organism and archaeological or other valuable objects.

Establishment of Diving Parks (Article 13):

- Characterization of marine areas as 'Organized Development Diving Park Area' (O.D.D.P.A.) for recreational diving, scuba divers' training and scientific or any other kind of research according to Article 10 of the Law 2742/1999 (Zoning Plan and Sustainable Development and other rules). In order to set limits to an area and characterize it as an O.D.D.P.A., an application has to be submitted to the Ministry for the Environment, Physical Planning and

Public Works by a body, that can be of any kind of legal form and is constituted by legal entity of the private sector, legal entities of the public sector, as well as unions, associations and joint ventures. The Minister of Environment, Physical Planning and Public Works, after meeting with representatives from relevant Ministries decide on the essential papers and procedure under which the body will apply.

- An Environmental Assessment Study is required, that has to be submitted along with the other papers. If there is an administrative body for the use and exploitation of a particular marine area, its approval is required for the characterization of the area as an O.D.D.P.A. The same stands in case that a marine area or part of it belongs to NATURA Network or a Marine Protected Area in general.

Article 14:

- Establishment of Hyperbaric Medical Centers in Regional and General Hospitals of Prefectures after the approval of the Minister of Health and Social Solidarity and the Minister of Mercantile Marine.

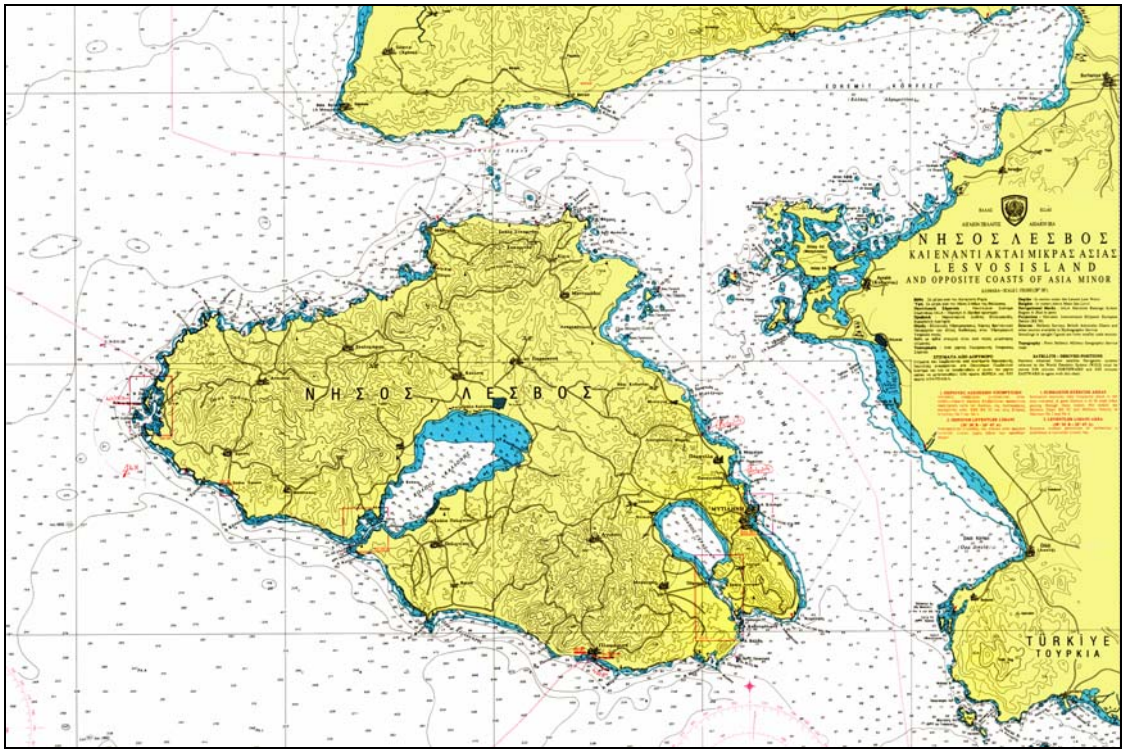
J. Profile of Lesvos Island

The Prefecture of Lesvos comprises the Islands of Lesvos, Limnos and Agios Efstratios, and hosts a De Facto Population of 109,118 persons and a Usual Resident Population of 108,288 persons (2001 census). More specifically, Lesvos is the third largest Greek Island, covering 1,635.998 km^2 and hosts a De Facto Population of 90,642 persons and a Usual Resident Population of 90.436 persons (2001 census).

Lesvos is visited annually by a more than 110,000 as seen in Table 1. According to data from the Hellenic Chamber of Hotels, Lesvos Island hosted 113 Accommodation Establishments, rated with 1-4 Stars, which carry 2,443 Bedrooms and 6,603 Bed places, in the year 2005.

Table 1: Tourist Movement in all types of Accommodation Establishments (including camping sites) in Lesvos Island.

2005	Data	Foreigners	Nationals	Total
	Guests	45,344	69,016	114,360
	Nights spent	372,998	220,569	593,567
2006	Guests	45,535	69,681	115,216
	Nights spent	366,871	211,352	578,223

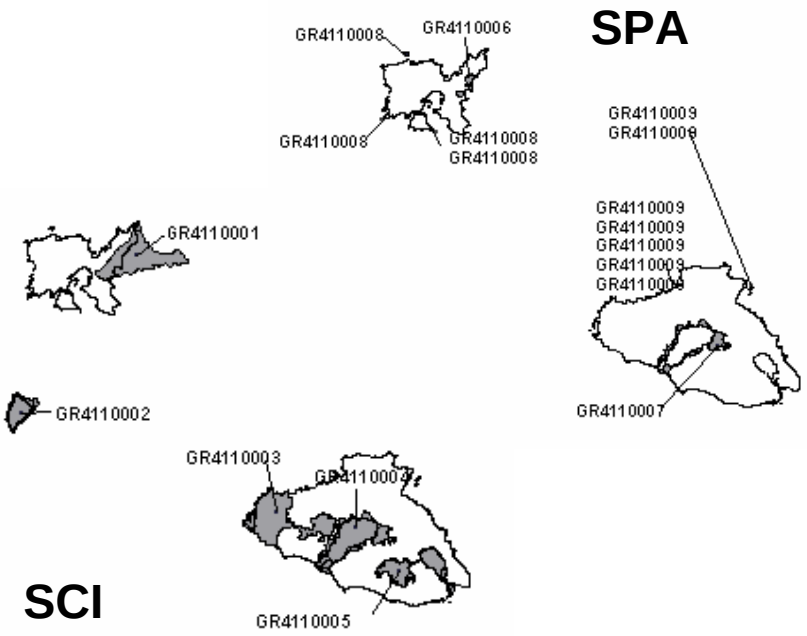


Picture 9: Hydrographical map of Lesvos Island and the opposite coasts of Asia Minor (Scale 1:150,000).

K. The Protection of Natural Environment in Lesvos Prefecture

The islands of Lesvos Prefecture host 4 Special Protection Areas (SPA), as defined in the Birds Directive and 5 Sites of Community Importance (SCI). A SCI is defined in the EU Habitats Directive (92/43/EEC) as a site which, in the biogeographical region (Greece as a country is part of the Mediterranean biogeographical region) contributes significantly to the maintenance or restoration of a favorable conservation status of a natural habitat type or of a species and may also contribute significantly to the coherence of NATURA 2000, and/or contributes significantly to the maintenance of biological diversity within the biogeographical region or regions concerned. They are

proposed to the European Commission by a State Member and once they have been approved; they can be designed as Special Areas of Conservation (SAC), as defined in the Habitats Directive (92/43/EEC).



Picture 10: SCI's and SPA's in Lesvos Prefecture (Lesvos, Lemnos and Agios Efstratios Islands).

The SPA's and SCI's of Lesvos Prefecture cover different types of natural habitats such as coastal wetlands and lagoons, bays and gulfs (e.g. the gulfs of Kalloni and Gera), clusters of rocky islets (e.g. Tokmakia), mountains (e.g. Olympus Mountain) and the unique Petrified forest of Sigri (see Table 4, in APPENDIX II).

Recognising the major geological and paleontological value of the site, the Greek State has declared the Petrified Forest of Sigri as a Natural Monument (Presidential Decree 443/85). The aim of designating the Petrified Forest as such was the more effective protection and rational management of the area. Moreover, Lesvos Petrified Forest Geopark is a founding member of the European Geoparks Network. In 2004 was decided its integration in the Global Network of Geoparks assisted by UNESCO.

Lesvos Petrified Forest Geopark comprises smaller parks (e.g. Petrified Forest Park, Sigri Park, Plaka Park, and Nisiopi Island). Apart from the large terrestrial part of the Geopark, there is also a wide coastal and marine part. However, diving is prohibited in the marine area of Sigri as it has been defined from the Greek Ministry of Culture

as a submarine archaeological site, reportedly to the new Law 3409 for recreational diving (Article 11) (see Table 5 in APPENDIX II).

Picture 11: Petrified trunks in the coastline of Plaka and Nisiopi Island Parks of Lesvos Petrified Forest Geopark.

L. Recreational Diving Activity in Lesvos Island

Lesvos, as a Prefecture, tries to develop the policy of the environmental orientated type of 'green' tourism (e.g. trekking, cycling, and scuba diving).

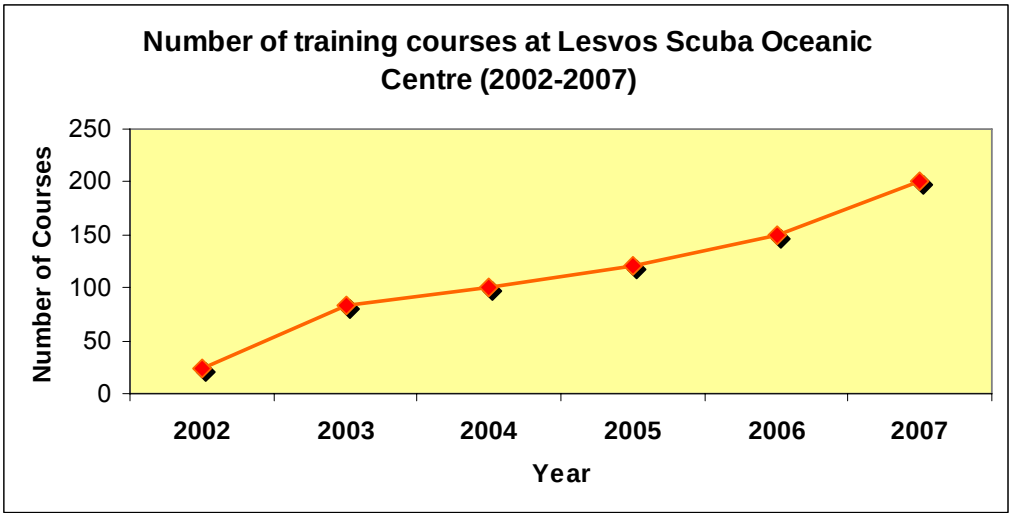
Nowadays there is only one Diving Centre in Lesvos, called 'Lesvos Scuba Oceanic Centre' which operated for the first time in 2002, offering its facilities to both local inhabitants (including a large number of students at the University of the Aegean) and visitors. It operates from two selected areas of Lesvos which are:

- Charamida Beach (Mytilene)
- Cavos Beach Club (Petra)

Lesvos Scuba Oceanic Centre is a fully certified P.A.D.I. member and has offered more than 670 training courses of different level (e.g. Open Water, Advanced, Rescue, and Divemaster) till 2007. The number of training courses has increased significantly since 2002 as seen on the following graph (Pic. 12).

The obvious increase of diving activity in Lesvos, during the last years is due to advertisement and the New Greek Recreational Diving Bill. Thus more than 520 people, mainly foreigners, have dived with Lesvos Scuba Oceanic Centre in Petra

and 180 in Charamiba during the touristic season (June-September) of 2007 while the last number reached approximately 250 people till late December.

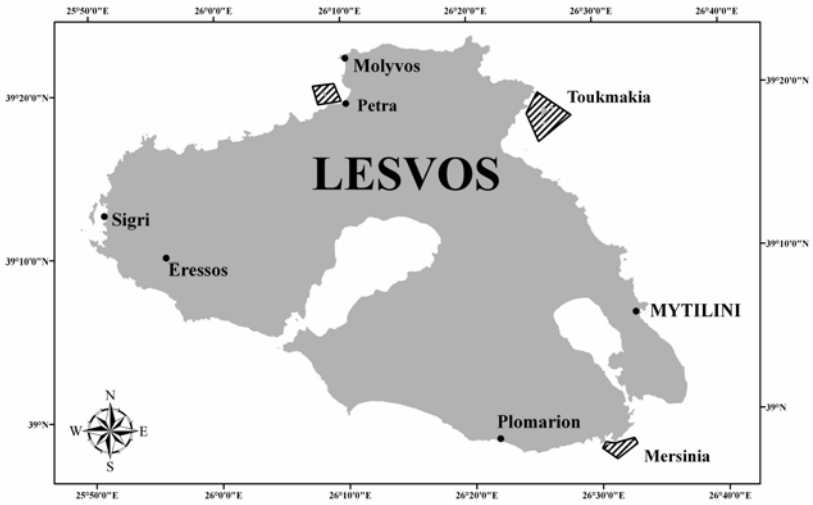


Picture 12: Number of training courses at Lesvos Scuba Oceanic Centre from 2002.

The main marine areas where diving activities take place in Lesvos Island are Charamida Beach, Petra and the islets Mersinia and Tokmakia. Furthermore there are 3 dive sites, suitable for wreck diving in Vatera and Cape Korakas. All the above areas can host different types of diving activities such as deep dives, multilevel dives, wall dives, wreck dives, cave dives, night dives for the qualified divers and discovery dives and training courses for new divers.

M. Oceanographic Environmental Preliminary Study for the Establishment of Diving Parks in Lesvos (Department of Marine Sciences)

The increased demands for establishment in the near future of Diving Parks in the Greek Seas were the motive for funding of an Oceanographic Study by Lesvos Prefecture. The aim of the study was to investigate the marine environment at three marine areas off Lesvos Island, which could potentially constitute target areas for the establishment of a diving marine park. The study areas included the cluster of islets ‘Tokmakia’ or ‘Tomaronisia’, the islets off the municipality of ‘Petra’ and the broader marine area of the islets ‘Mersinia’, including Fara islets and Tarti Bay as well.



Picture 13: The three Marine Areas off Lesvos Island surveyed in the framework of the Oceanographic Study.

The islets of the marine areas of 'Tokmakia' and 'Petra' are Special Protected Areas – SPAs (GR4110009), belonging to the NATURA 2000 Network of Greece (Council Directive 92/43/EEC). Moreover they constitute one of the 196 Important Bird Areas (IBAs) of Greece (GR136, Birdlife International) as sites particularly important for bird conservation. The site is important for breeding coastal bird species like Audouin's Gull (*Larus audouinii*).

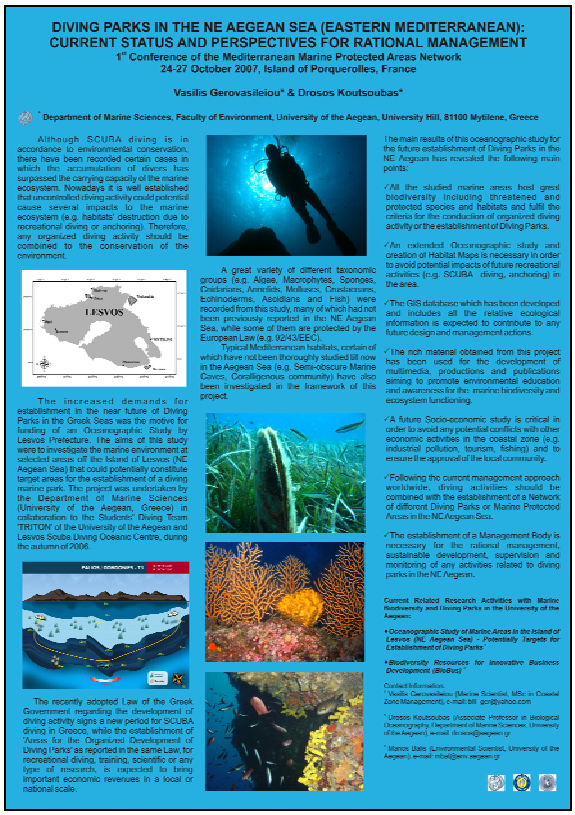
The project was undertaken by the Department of Marine Sciences (University of the Aegean, Greece) in collaboration to the Students' Diving Team "TRITON" of the University of the Aegean and Lesvos Scuba Diving Oceanic Centre, during the autumn of 2006.

More than 200 marine species were recorded from this study, many of which had not been previously reported in the NE Aegean Sea, while some of them are protected by the European Law (e.g. 92/43/EEC). Typical Mediterranean habitats (e.g. Posidonian beds), certain of which have not been thoroughly studied till now in the Aegean Sea (e.g. Semi-obscure Marine Caves, Coralligenous beds) have also been investigated in the framework of this project.

All the studied marine areas host great biodiversity including threatened and protected species and habitats and fulfill the criteria for the conduction of organized diving activity or the establishment of Diving Parks.

Picture 14: The diving boat “Calypso” from Lesvos Scuba Oceanic Centre was used for the oceanographic study (left). Members of the Students’ Diving Team “TRITON” who took part in the project (right).

In the framework of this oceanographic study, a GIS database which includes all the ecological information was developed, expecting to contribute to any future design and management actions. Moreover the rich material obtained from the project was used for the development of multimedia, productions and publications, aiming to promote environmental education and awareness for the marine biodiversity and ecosystem functioning.


DIVING PARKS IN THE NE AEGEAN SEA (EASTERN MEDITERRANEAN):
CURRENT STATUS AND PERSPECTIVES FOR RATIONAL MANAGEMENT
1st Conference of the Mediterranean Marine Protected Areas Network
24-27 October 2007, Island of Porquerolles, France

Vasilis Gerovasileiou* & Drosos Koutsoubas*

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Although SCUBA diving is in accordance to environmental conservation, there have been recorded certain cases in which the accumulation of divers has surpassed the carrying capacity of the marine ecosystem. Nowadays it is well established that uncontrolled diving activity could potential cause several impacts to the marine ecosystem (e.g. habitats destruction due to recreational diving or anchoring). Therefore, any organized diving activity should be combined to the conservation of the environment.

LESVOS

The increased demands for establishment in the near future of Diving Parks in the Greek Seas was the motive for leading of an Oceanographic Study by Lesvos Prefecture. The aims of this study were to investigate the marine environment at selected areas off the island of Lesvos (NE Aegean Sea) that could potentially constitute target areas for the establishment of a diving marine park. This project was undertaken by the Department of Marine Sciences (University of the Aegean, Greece) in collaboration to the Students' Diving Team TRITON of the University of the Aegean and Lesvos Scuba Diving Oceanic Centre, during the autumn of 2006.

The recently adopted Law of the Greek Government regarding the development of diving activity signs a new period for SCUBA diving in Greece, while the establishment of 'Areas for the Organized Development of Diving Parks' as reported in the same Law for recreational diving, training, scientific or any type of research, is expected to bring important economic revenues in a local or national scale.

A great variety of different taxonomic groups (e.g. Algae, Macrophytes, Sponges, Cnidarians, Annelids, Molluscs, Crustaceans, Echinoderms, Ascidians and Fish) were recorded from this study, many of which had not been previously reported in the NE Aegean Sea, while some of them are protected by the European Law (e.g. 92/43/EEC).

Typical Mediterranean habitats, certain of which have not been thoroughly studied till now in the Aegean Sea (e.g. Semi-obscure Marine Caves, Coralligenous community) have also been investigated in the framework of this project.

The main results of this oceanographic study for the future establishment of Diving Parks in the NE Aegean has revealed the following main points:

✓All the studied marine areas host great biodiversity including threatened and protected species and habitats and fulfil the criteria for the conduction of organized diving activity or the establishment of Diving Parks.

✓An extended Oceanographic study and creation of Habitat Maps is necessary in order to avoid potential impacts of future recreational activities (e.g. SCUBA diving, anchoring) in the area.

✓The GIS database which has been developed and includes all the relative ecological information is expected to contribute to any future design and management actions.

✓The rich material obtained from this project has been used for the development of multimedia, productions and publications, aiming to promote environmental education and awareness for the marine biodiversity and ecosystem functioning.

✓A future Socio-economic study is critical in order to avoid any potential conflicts with other economic activities in the coastal zone (e.g. industrial pollution, tourism, fishing) and to ensure the approval of the local community.

✓Following the current management approach worldwide, diving activities should be combined with the establishment of a Network of different Diving Parks or Marine Protected Areas in the NE Aegean Sea.

✓The establishment of a Management Body is necessary for the rational management, sustainable development, supervision and monitoring of any activities related to diving parks in the NE Aegean.

Current Related Research Activities with Marine Biodiversity and Diving Parks, at the University of the Aegean:

• *Oceanographic Study of Marine Areas in the Island of Lesvos (NE, Aegean Sea) – Potentially Targets for Establishment of Diving Parks*

• *Biodiversity Resources for Innovative Business Development (BioBus)*

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Picture 15: Poster presented in the 1st Conference of the Mediterranean Marine Protected Areas Network, 24-27 October 2007, Island of Porquerolles, France.

N. Conclusions and Future Proposals

The establishment of a MPA is a long term initiative that involves many stakeholders and different groups of people who must support the project in order to safeguard its success. The support and participation of the local society and authorities in any kind of effort is critical for the approval of the establishment of a MPA.

It usually requires several months or even years of work before the final approval and launch of the project. Therefore, it is essential setting up a project team with the acknowledgment of all stakeholders during this preparation phase. The leadership of this team must be clarified and the team must include representatives from all sides. Responsibilities of the project team should include:

- ✓ Preparing formal applications to the relevant Ministries with all the necessary information (e.g. characteristics of the proposed sites, relevant surveys).
- ✓ Organizing of a carefully designed informative campaign for the local society and decision makers, with the use of different effective means and tools (e.g. brochures and leaflets, presentations and exhibitions, multimedia, tours).
- ✓ Investigating a financial plan of the project and potential sources for long term funding.
- ✓ Preparing for the future management body of the MPA which will integrate the project after the establishment of the MPA.

With this concept, it is proposed to first organize a workshop with the participation of the University of the Aegean and representatives from Mediterranean MPAs in order to present their case studies, gained experience and knowledge. The workshop could be followed by open dialog with members of the local community and stakeholders of the area.

The objective of this workshop will be to set up officially a project team for the case of establishing a MPA in Lesvos, and to place the issue of the necessary studies which have to be conducted. More specifically, a Special Environmental Study is absolutely necessary for establishing any Protected Area. This study is proposed to include or be accompanied by an Oceanographic study and creation of detailed Habitat Maps in order to avoid potential impacts of future recreational activities (e.g. SCUBA diving, anchoring) in the area. A Socio-economic study is also critical in order investigate the future success or of the MPA and to avoid any potential conflicts with other economic

activities in the adjacent coastal zone (e.g. industry, tourism, fishing) and to ensure the approval of the local community.

Following the current management approach and practices worldwide, diving or any other type of environmental orientated recreational activities should be combined with the establishment of a **'Network of Protected Areas'** in the NE Aegean Sea. This case could be combined with the existence of the 5 Sites of Community Importance (SCI), 4 Special Protection Areas (SPA) and the Lesvos Petrified Forest Geopark in Lesvos Prefecture (Lesvos, Limnos and Agios Efstratios Islands) (see APPENDIX II). Furthermore, additionally to the existed Oceanographic Survey in the 3 marine areas 'Tokmakia', 'Petra' and 'Mersinia', more areas should be investigated in order to be included in the future plans for environmental protection and development. Several coastal marine areas in Lesvos, Limnos, Agios Efstratios or even the neighbouring Chios Island are suitable for the development of recreational activities, always with the premises of environmental protection and conservation.

O. Participation in Conferences & Workshops

For the needs of this research important information was gathered from conferences and workshops where we had the opportunity to meet and discuss with representatives from different organizations for the Protection of the Environment and Marine Conservation (e.g. IUCN, RAC/SPA, WWF), Mediterranean MPAs (e.g. Port-Cros National Park, France; Miramare Marine Reserve, Italy; Marine Protected Area of Illes Medes; Spain; National Marine Park of Zakynthos, Greece; National Marine Park of Alonissos – Northern Sporades, Greece; Kaş-Kekova SPAMI, Turkey) as well as Ministries (e.g. Hellenic Ministry of Mercantile Marine, The Aegean and Island Policy), Institutions (e.g. Hellenic Centre for Marine Research) and groups of people (e.g. Diving Clubs), involved in the current issue of the establishment of Diving Parks in Greece. Particularly we have attended the following conferences and workshops:

- 9-11 March 2007: 6th MEDPAN Workshop "*Consultation and Consensus Building in Mediterranean Marine Protected Areas*", National Marine Park of Zakynthos, Greece.
- 24-27 October 2007: 1st Conference of the Mediterranean Marine Protected Areas Network, Island of Porquerolles (Port-Cros National Park), France.
- 2 February 2008: Public Meeting about "*Diving Parks in Greece: Questions and Perspectives*", SCUBA Club 'TETHYS', Athens, Greece.

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