Socially Sustainable MPAs (SoS MPAs) and Marine Impact Trade (MIT)

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Abstract

The Mediterranean basin faces an increasingly acute problem of marine environment degradation due to extreme human intervention and overexploitation. Marine Protected Areas (MPAs), the main measure currently in place, are criticised for displaying limited success due to inherent disadvantages (their large size makes MPAs hard to finance, manage and police; while the restrictions and loss of income they impose, cause local communities to be hostile to their presence). A new institutional tool is required that will ensure sustainable marine conservation without burdening State budgets, and create alternative income sources and development opportunities for locals. Measures that would meet these requirements should be applicable by the State and in line with the polluter pays principle, but still present advantages to those called upon to bear their cost.

We propose a form of Marine Impact Trade (MIT), which would allow a State to offset marine environmental impact, caused by any sector of the economy, with marine protection activities, advantageous to those who have to implement them, while also benefiting local communities to an even greater extent; thus rendering such measures affordable to the payers and welcomed by the locals. We propose a pilot MIT application using the novel concept of Diving Parks (small self-financed and sustainable marine no-take areas, dedicated to recreational diving, already proven to rapidly restore and

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sustainably protect the marine environment). These Diving Parks, initially financed by polluters and run by them hand-in-hand with local entrepreneurs and communities, shall provide immediate and effective marine environmental rejuvenation and sustainable conservation. Additionally, this offers an opportunity: (a) for polluters/payers to display social responsibility and even make a profit (instead of a loss), and (b) for local societies to reap the benefits of an impressive development in tourism and related activities, cultivating local environmental consciousness and pride. A centrally monitored network of such scattered self-sustained Diving Parks, for which we have coined the term Socially Sustainable MPAs (SoS MPAs), can extend to establish and provide effective ongoing biodiversity protection to a large number of marine locations.

Introduction: The declining sea.

Over the past 60-70 years, mankind appears to have caused greater damage to the sea than that brought on by all the previous millennia of human history. These problems affect the Mediterranean Sea in particular, as its coastlines have been densely populated by active populations since antiquity (López Ornat, 2006).

Despite the fact that it is a semi-enclosed marine basin with low natural productivity (low concentrations of nutrients – i.e. oligotrophic), the Mediterranean Sea is one of the richest seas in the world in terms of biodiversity, with approximately 10,000 species of flora and fauna recorded, a high percentage of which are endemic (*Panagiotides*, 2004). However, the coastal ecosystems of the Mediterranean Sea have been under increasing pressure from human activities over the past decades, with the result that, ever expanding regions display a dramatic decline in fish stocks, a decline or threatened collapse of marine ecosystems and an immediate threat to marine biodiversity. Industrial waste and urban sewage, agricultural fertilizer run-off, and local incidents of eutrophication, extensive over-fishing, petroleum pollution, unregulated coastal residential development, mass tourism and, finally, the invasion of allochthonous (alien) species into the Mediterranean ecosystem have inevitably burdened the environment (European Environment Agency, 2005 & Boero, 2007). It is therefore necessary to take drastic steps, while conditions are still reversible, in order, on the one hand, to protect marine ecosystems from further degradation and, on the other hand, to reconstitute, restore and conserve marine biodiversity. Protection measures are already being put in place by sovereign states, as well as international organisations and associations, with the assistance and guidance of the scientific community.

Marine Protected Areas – MPAs

One of the main measures established and applied *in situ* is the institution of Marine Protected Areas – MPAs. The International Union for Conservation of Nature (IUCN) defines Marine Protected Areas (MPAs) as: "*any area of the littoral 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*". The purpose of MPAs is to protect and conserve marine biodiversity, as well as the productivity of marine habitats, both major and definitive factors affecting the health of the broader ecosystem (Kelleher, 1999).

Inherent disadvantages of traditional MPAs. New scientific findings and directions.

MPAs are an important and necessary measure. However, they still do not cover a sufficient percentage of marine area, either in the Mediterranean Sea or elsewhere. Scientists and international environmental organisations assert that in order to establish effective and sufficient protection of the marine environment, 10 to 15% of the sea worldwide will have to be protected and conserved. Currently, less than 1% is protected (Kelleher, 1999; Dalias *et al.*, 2007) and only 0.01% is under absolute conservancy status, where all fishing is prohibited (no take zones - Roberts and Hawkins, 2000).

The United Nations Environmental Programme (UNEP) Convention for Biological Diversity (CBD), adopted COP 6 decision VI/26 in 2002, according to which, a significant reduction of the current rate of biodiversity loss must be achieved by 2010 at a global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth - known as the 2010 Biodiversity Target (see also the 1st Conference of the Mediterranean Marine Protected Areas Network – MedPAN, in Porquerolles, France, with the corresponding goals for the Mediterranean, Maison *et al.* 2007).

Despite this, in 2007 in the Mediterranean and the 21 countries which surround it there were 75 MPAs and an additional 30 were planned (Dalias *et al*, 2007). In 2008 there were reports of 102 coastal marine protected areas, which covered approximately 10,000 sq.km., i.e. just 0.4% of the Mediterranean. Of these, only 40 were reported to contain no-take zones, covering a total of only 300 sq.km., i.e. 0.01% of the Mediterranean Sea (Pergent-Martini and Notarbartolo di Sciara, 2008, & Abdulla *et. al*., 2008).

Additionally, in 2008, UNEP with decision COP 9 IX/18, as regards Protected Areas within the framework of the Convention for Biological Diversity, underlined the need for further efforts in order to achieve the 2012 biodiversity target for marine protected areas, and invited parties, *inter alia*, to recognise the contribution of, where appropriate, co-managed protected areas and private protected areas. A target which, due to poor results, has, however, already been reconsidered during the Tenth Meeting of the Conference of the Parties to the CBD at Nagoya Japan in 2010 (COP10) and the date for achieving this target was postponed to 2020. In 2006 the European Commission adopted a European policy to halt the loss of biological diversity by 2010 and beyond (COM/2006/216); which was followed by Directive 2008/56/EC of the European Parliament and the European Union. According to this directive (see preamble and article 1), *inter alia,* by 2020 European States shall be obligated, to design strategies and take measures to restore and achieve or maintain good environmental status in their marine waters, designed on the basis of the principle of prevention, as well as the principles of taking preventive action, prioritizing repair of environmental damage at the source and the principle that the polluter pays. According to Article 1, paragraph 3 of the Directive: "*marine strategies shall apply an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations*".

These ambitious goals have been met with understandable scepticism, because international practice to date has rendered obvious that the rapid and sufficient expansion of MPAs, as well as the effectiveness of those in existence, is impeded by a series of technical, social as well as economic factors, while no alternative efficient tools appear to exist for the implementation of the relevant strategies and policies. MPAs are, in general, large marine expanses, hard to administer and police, within which restrictions are enforced on human activities and fishing, in particular, so they affect a number of local or more widely-ranging manifold interests, while limiting traditional wealth-creating activities (Jones, 2006). At the same time they require disproportionately large economic and scarce expert human resources to establish, support, maintain and operate such areas (administration, staffing, monitoring and guarding); resources which, particularly under the current economic conditions, are hard for most states to afford (Emerton *et al.*, 2005 & López Ornat and Jimenez, 2006). According to a 2004 study by Balmford *et al*, based on the financial data of 83 marine protected areas worldwide, a planet-wide network of such areas, which would cover 20-30% of the world's waters, would cost up to 19 billion dollars annually, (which, however, they note, represents only 2% of annual military expenditure worldwide, or the annual worldwide expenditure on cosmetics or pet food).

There are already official reports that many marine protected areas in the Mediterranean Sea are lacking sufficient means for effective management, so that it is impossible to implement real protection measures (Dalias *et al*., 2007, Maison *et al*., 2007, & Abdulla *et. al*., 2008). We have therefore reached the point where the scientific community is faced with the question: "*Can traditional marine 'protected' areas be effective?*" This is in fact the verbatim title of an article by Jameson *et al*., in Marine Pollution Bulletin, (2002), 44, pp. 1177-1183, where, along with references to many other authors and specific documented examples, the ineffectiveness of MPAs is noted to be self-evident, to the point that these risk being considered as paper parks. The aforementioned authors consider that this occurred, because the operation of existing MPAs is guided solely expenditure-oriented, without the use of business criteria, sense of competition, business planning and, consequently, without any provision for viability, resulting in their inability to secure a long-term and steady supply of operating resources, that would allow them to implement the requisite legal and regulatory protective measures. Kelleher (1999) shrewdly pointed out, that, additionally, one of the factors that impede the institution of new, effective MPAs is the ongoing fear of scientists, that they lack sufficient information concerning the regions to be protected and, he concludes, that the elusive desire to create an ideal MPA is, in the long run, more detrimental, as it deters the creation of any *de facto* MPA, which, in its day-to-day function, would certainly provide scientists with the information and documentation they seek.

Scientists led to seek ways in which to engage private initiative in order to protect the seas.

The aforementioned inherent disadvantages of traditional Marine Protected Areas, and particularly their cost, which is hard for State budgets to meet, have led several scientists to conclude, that effective protection of the marine environment cannot be achieved without the involvement and participation of the private sector. Thus Kelleher (1999) concluded that the contemporary trend for MPAs was to increasingly include private initiatives / private sector criteria, as well as involve local communities and NGOs, with the urgent requirement that MPAs achieve financial self-sufficiency and viability,

coupled with cutting MPA dependency on state funding. (Similar conclusions were drawn by Spergel and Moye, 2004).

Spergel and Moye (2004) in their article '*Financing Marine Conservation: A menu of options*' (WWF, Center for Conservation Finance), as well as, Jameson *et al*., (2002) and others concluded that MPAs could become effective in protecting the environment, yielding a return to society, in accordance with their scope, only with the application of rational business management criteria, which will ensure their profitable and therefore sustainable operation. Already, the IUCN World Conservation Congress, which took place in Barcelona, Spain on October 8, 2008, reached an official conclusion, *inter alia*, that private sector involvement in biodiversity conservation is a win-win deal, as this will increase companies' revenue by responding to an increased consumers' demand for ethical products, and second, that, Public Private Partnerships (PPP) may also be applied to responsible commercialization of protected areas.

The above IUCN conclusion is based on Saporiti (2006), who concluded, that: "*…many national parks in developing countries exist only on paper, lacking enough funds to pay for staff salaries, patrol vehicles, or wildlife conservation programs. (...) Responsible commercialization offers a way to capture their significant economic value. Public-private partnerships can play an important part in this. They offer a powerful policy tool for improving the economic sustainability of parks, enhancing the quality of services, efficiently leveraging investment in conservation, and, through all this, contributing to the core function of protecting biodiversity. Commercially managed protected areas can generate enough revenue to fully cover operating and maintenance costs. Most do not need operating subsidies to be economically viable*".

Colwell (1999) also supports this viewpoint: "*...Entrepreneurial MPAs may perform several valuable functions. They protect discrete areas that serve as refuges for threatened marine life, build local capacity in MPA awareness, support and management, act as test cases for MPA management techniques and provide core areas around which larger MPAs could be developed. By establishing effective on-site management more easily than with more traditional government-formed MPAs, entrepreneurial MPAs provide the quick success stories that planners and managers need in order to convince a broader audience of the value of MPAs. (...) For the immediate future, private management of small-scale MPAs may well be the key to successful conservation in a number of coral reef areas that otherwise would have little or no hope of meaningful protection...*".

Similar reports are made by Riedmiller (1998), founder and administrator of the first private marine park in the world, the exceptionally successful park established on the coral island of Chumbe off East Africa: "*The private sector is also beginning to be seen as a management option for marine protected areas. (...) Viable partnerships for the management of a particular marine area are more likely when local communities, traditional fishers and tourism operators are acknowledged as belonging to the (formal and informal) private sector that responds to similar economic incentives. Small-scale fishers, shell collectors and seaweed farmers who depend on reef resources for their survival, may have more common interests with local tourism and dive operators than with central government agencies and foreign-funded NGOs. (...) Support to private initiatives may help alleviate the commercial risks of long-term investment in conservation*

and integrate a wider range of stakeholders in coastal zone management, and thus improve local political support to MPAs".

Beyond the narrow framework provided by experts in the field and despite old taboos, society in general has also come to realise that protection measures for the marine environment require financial rationalization in order to be, finally, implemented effectively and this will be achieved through private administration. Examples include articles such as '*Saline Solutions*', included in the targeted study conducted by John Grimond, entitled '*Troubled Waters*' and published in *The Economist* (30-12-2008), which states: "*...In the meantime some practical measures must be taken. Above all, is has become plain that the absence of ownership does not make for good management. The sea needs owners and where that is impossible, it needs international agreements for regulation, management and policing. Peru, whose anchoveta fishery is the largest in the world, is coming round to a rights-based approach to fishing, as are some African and South-East Asian governments*".

In confirmation and ratification of the above references, the International Conference of the Parties to the CBD in Nagoya, Japan, in 2010, recognised and emphasized the need for private enterprise, including middle- and small-sized enterprises to be involved in the protection of the marine environment; as well as the need to establish offset programmes for this purpose (COP 10).

Does size matter?

While questioning operational methodology for marine protected areas, Halpern (2003), also radically broke with convention and challenged the actual size of marine protected areas. Based on results from 89 discrete studies, he concluded that, what counts is the effectiveness of marine protected areas, as regards increasing four of the most important biological indicators, i.e. biodiversity, density, total biomass, and average size per capita: thus it is not the size of the area that counts, as even a small marine area, when it is well protected, can provide the same rates of rejuvenation and growth, so that, in parallel with larger protected areas, small parks will provide an optimal result as far as protecting the marine environment is concerned. Similar conclusions were drawn by Francour *et al*., 2001. Additionally, Halpern and Warner (2002), based on 112 independent measurements taken at 80 marine parks, state that the benefits of protection can be achieved very rapidly, from the very first years of their operation.

Methodological approach for effective marine protection. The concept of Marine Impact Trade (MIT).

All the above indicate, that what is required in order to achieve effective marine protection, without the inherent disadvantages of traditional MPAs, are extensive networks of smaller, more numerous, easy-to-administer and police Marine Protected Areas, where all forms of fishing are strictly prohibited. These would constitute small 'pockets' where marine biodiversity could be regained, reproduced and disperse outward (Markatos, 1987; as well as Francour *et al*., 2001); and would lead to the creation of National Systems of small marine protected areas, which systems have already been reported to be effective environmental protection instruments (Roberts and Hawkins,

2000, Gallacher-Freymuth, 2002, Spergel and Moye, 2004, López Ornat, 2006, Alban *et al*., 2006). This will also result in wide-ranging experience-based information feedback, which would provide further scientific documentation and optimization of the practices followed, something that the scientific community has been seeking (Kelleher, 1999). Additionally, irrespective of the number of these areas, each would also need to be financially viable, without creating additional burdens on State budgets.

This formula appears attainable, only if private enterprise also plays an active role; for which, the private sector would have to anticipate specific benefits, or the State should mandate such participation so that polluters could offset the environmental impact of their activities. All this leads to the concept of Marine Impact Trade (MIT), which would require nations to legislate a legal obligation for those who pollute the sea, and to the degree to which each individual or corporation pollutes, to establish and maintain MPAs, in order to discharge their environmental and social responsibility.

The name itself leads us to put up warning flags, as in the past the related institution of CO_2 emissions trade received a great deal of criticism, as an ineffective environmental protection tool for profit, which was not transparent and penalised underdeveloped countries and societies, whose development it stands accused of impeding (Gilbertson and Reyes, 2009). In order to avoid the mistakes of the past, the new institution of mandatory set-off MPAs, beyond the above requisite characteristics, would have to also ensure transparency, by being obliged to include local societies, both in the administration and in the benefits of these areas, so that these can become socially sustainable and acceptable (Socially Sustainable MPAs or SoS MPAs). At the same time, the mandatory involvement of private individuals must be sought in the least onerous and, if possible, most beneficial manner, in order not to propel private investors, adaptable and ingenious as they are, into avoiding such an obligation or minimizing the extent to such an obligation is fulfilled.

However difficult it might appear to achieve all this, there is at least one environmental and development instrument, which appears to permit the coexistence of all the prerequisites for successful and effective implementation of a broad-ranging network of SoS MPAs, and without undesirable economic or social impact: such a measure would be Diving Parks.

Diving Parks as an ideal instrument for effective marine environmental protection.

Diving Parks, which have already been legislated in Greece with article 13 of Law 3409/2005 on recreational diving (perhaps in the first instance worldwide, Anagnostou, 2008), can be defined as: Small protected marine areas, whose position and underwater terrain are suitable for recreational diving, whose limits are marked with buoys, closed to every form of fishing and to all intervention or other activity besides recreational diving, seabed observation and scientific research; these areas would be sustainable and autonomously viable due to the income from visitor tickets, (Koutsis, 2006), and independent of the existence or not of other traditional MPAs in their area. (For a more detailed presentation of the institution of diving parks see: Markatos and Koutsis, 2008, which is also available on the web at: http://www.tridentstar.org/en/pdf/divingparks_tni.pdf).

Diving Parks constitute a combination of small-scale MPAs and diving for the price of a ticket, which will ensure ongoing economic sustainability, and consequently effective policing and protection, as well as independence from state subsidies. They were rendered feasible due to the rapid rise in popularity of recreational diving worldwide, an activity that has been proven to be compatible with the protection and conservation of the underwater environment, which has now become widespread with people of all ages and backgrounds. Besides their purely environmental benefits, diving parks also provide large direct benefits for local societies, which may well live from the parks and develop alongside them. They also provide a comparative tourism advantage without the need for major investments, as they greatly extend the tourist season, attracting a new, ancillary and self-sufficient stream of environmentally conscious tourists, with disposable income, who also supply and rapidly develop the local market, without any negative consequences to the environment. Diving parks provide direct and appreciable benefits for coastal fishermen, as they act as natural marine breeding grounds, which supply and enrich fish stocks in the surrounding sea area.

A tangible and particularly successful example of a diving park, even though it is not officially known as such, is the Medes Islands Park in Estartit, Catalunia, Spain. This is an MPA, which is, however, very small in size (0.932 km^2), where the core zone is open to recreational scuba diving. Divers love it - currently, it hosts 50,000 dives annually, after a limiting scientific intervention, (López Ornat, 2006), while previously it received 75,000 dives, (Francour *et al*., 2001) – and this has had accompanying benefits for the development of the local economy. This small Park has achieved autonomous economic sustainability and a high level of environmental protection, while gaining the approval and backing of the local society, resulting in a dramatic reconstitution and increase of marine biodiversity, overall biomass and average individual size of the various species (Francour *et al*., 2001, Mundet & Ribera, 2001, Munoz, 2007). A comparable success is the islet of La Gabinière, which is, in fact, contained within the wider-ranging MPA of Port Cros in the South of France.

The repeatability and ease-of-administration displayed by diving parks can and should lead to the creation of a broader network of diving parks, in essence the requisite National or trans-national System of Protected Areas we mentioned earlier. Such a network, centrally-monitored and scientifically controlled by state or trans-border Authorities, can also provide a broad scientific information base, which would allow long-term measurable evaluation and improvement of this new environmental measure. A fundamental difference between a diving park and a traditional National Marine Park (MPA), consists of the fact that being small, the diving park is easy to manage and police and it can turn a profit, which makes it attractive and achievable for the private as well as the public sector, offering the potential of many mixed forms of collaboration between the two. This ensures that diving parks will operate rationally, based on the rules of the business world, and will achieve the requisite viability and sustainability, nowadays so sought-after by scientists.

Diving Parks as the ideal tool for the creation of SoS MPA networks.

Despite the fact that diving parks appear suitable for private investors, the environmental need for them is so pressing, that any such involvement by private enterprises should not be left to luck. This particularly when taking into consideration, that

certain diving parks, such as those in remote regions, may have small or no profitability, in and of themselves, while remaining, nevertheless, essential for the protection of the marine environment. As has already been stated, one way for states to require the involvement of private individuals in the establishment and maintenance of marine protected areas, would be to require this of specific individuals or companies, who need to offset pollution caused by their entrepreneurial activities. Coastal shipping and sea transport in general, port works, sewage and industrial waste disposal, drilling for or transporting hydrocarbons, extensive changes of the coastal zone brought about by the hotel industry, establishing and operating fish farming facilities are some examples of actions that burden the marine environment. Diving parks appear to be an excellent way in which to return to the sea at least part of the capital that is removed from it, but also to provide local societies with some form of set-off for the inevitable degradation of their natural environment. Thus the mandatory creation and operation of diving parks by those who pollute the sea could well constitute a state offset measure (Offset Diving Parks). To require offset benefits from entrepreneurs, and particularly concessionaires of Public goods, is not an unknown practice internationally, whereas it is both legitimate and common, to require private entities that deal with the public to return to it, and to local communities in particular, part of the benefits they reap from such exploitation.

The specific difference and major comparative advantage of Offset Diving Parks, in comparison with other measures, that could be put forward, would be that establishing and operating a diving park does not, in and of itself, constitute a burden, but could, on the contrary, be viewed as a profit-making investment and enterprise, even if the returns are on a smaller scale than more intensive forms of marine exploitation. By establishing a diving park, "the offset is set off" and the entrepreneur gains the possibility of additional gains, instead of a pure expense. In tandem with this, an enterprise that establishes and operates a marine park, has the added benefit that it presents an exceptional example of corporate social responsibility, improves relations with local communities, which also benefit, and certainly pleases its more environmentally-conscious clients.

Particularly when it comes to relations with local communities, the State, which will decide to adopt Offset Diving Parks, gains a broad spectrum of approaches and possibilities. It can, for example, legislate that those liable to establish Offset Diving Parks, are obligated to leave part of the share capital available for a specific period of time, in order to provide the opportunity for local entrepreneurs to participate in the Park, should they wish. The state may also mandate that free share capital, as well as participation in the park administration, should also be provided to the local Municipality, in order to achieve transparency, and provide the local community with ongoing, accurate and timely information about the Park's management.

The establishment of Offset Diving Parks would be entirely in line with Decision P6-TA[2007]0195 of the European Parliament, dated 22 May 2007, to halt the loss of biological diversity, which focuses attention on the potential provided by implementing the polluter pays principle, in line with the Directive on Environmental Responsibility, and encourages member-states to utilise this to fund measures that would support the achievement of environmental goals. Offset Diving Parks appear to be free of the disadvantages of the institution of CO_2 emissions trade, as they involve polluters themselves directly in offset activities for their interventions in the marine environment and consider them to be liable for such offset, while providing State monitoring, and

ensuring actions are taken in collaboration with local communities, within a framework that is transparent and financially sustainable for all.

Conclusions

Networks of diving parks, combined in accordance with the above in an offsetting way, with maritime-related entrepreneurship and society, constitute a first-class vehicle for active, conscious and long-term protection of the marine world (the "blue ecology"). What's important about offset diving parks is that, while they might be private enterprises, they remain nevertheless essentially a state measure, in other words, a Centrally Organised Marine Impact Trade, (COMIT). So while they provide private company economic criteria for rational and sustainable administration, which are highly sought-after by the scientific community, they also retain ties to state-supported MPAs. This, without burdening state budgets; and additionally with the whole-hearted acceptance and support of the community, which, beyond the direct economic and developmental benefits, which it will reap, will certainly welcome this particular state intervention to undo the damage entrepreneurship has wrought on the marine environment. By adopting Offset Diving Parks, we can look at a mutation of the institution of the diving park into a Socially Sustainable Marine Protected Area (SoS MPA). Of course, Offset Diving Parks will not be the sole form of marine impact trade (MIT), because private entrepreneurs, guided by scientific advances and supported by state agendas will naturally discover many other measures that will meet this need. Whatever the case, until other, more attractive measures are found, SoS MPAs in general and offset diving parks in particular appear tailored to fulfil the specific requirements set by the scientific community at the International Conference at Nagoya in 2010, and in general to constitute the most realistic implementation tool and cause for optimism that we might approach the IUCN and CBD goals for sufficient marine protection, by 2020, as set out by COP 10, as well as the strategic directive 2008/56/EC.

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