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Measuring Marine Protected Areas' Conservation Effort: A Different Look at Three Deeply-Rooted Illusions

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Abstract

As a major tool for policies to protect biodiversity, the current idea of Marine Protected Areas is based on a triptych (a status, a perimeter, and regulations) that is intended to ensure their effectiveness, with the conservation effort assessed by adding up the classified surface areas. Based on an international comparative analysis using 13 differentiated case studies, we take another look at three founding illusions according to which (a) the MPA status corresponds to protection (b) on the level of the classified perimeter, and (c) founded upon regulations laid down to be respected. Our analysis shows that the status is an activatable capital, whose activation may encounter various obstacles that we have listed; that we should distinguish between two levels and types of protection, active and passive, rather than stick to the classified perimeter; that the lack of specific regulations means nothing with regard to the lack of protection; and that MPAs with a legal arsenal at their disposal use these rules first and foremost as a medium for dialogue with stakeholders, with various aims. This analysis leads us to specify what MPAs actually are, and to suggest new means and indicators to assess the conservation efforts made.

Keywords: Biodiversity, Case Study, Conservation Policies, Governance, Marine Protected Areas, Political Ecology

1. Introduction

Biodiversity's alarming decline across the planet affects marine species as much as it affects species on land. According to the WWF Living Planet Report [1], marine species declined by 39% between 1970 and 2010,¹ especially in tropical zones and the Southern Ocean where sea turtles, large migrating birds and sharks. In light of this, in 2010, the 168 member states of the Conference of the Parties to the Convention on Biological Diversity pledged to attain a ratio of 10% of marine and coastal zones designated as protected areas by 2020.² And indeed, while 0.7% of oceans were officially protected in 2000, this had risen to 7,6% by January

¹ These figures are based on measurements covering 3,132 populations of 910 species of mammals, birds, reptiles and fish since 1970.

² According to the "Aichi Targets" that are among the 17 Sustainable Development Objectives of the United Nations Agenda by 2030.

2020 [2]: the surface area covered by Marine Protected Areas (MPA) is constantly increasing. By creating MPAs in its territorial and deep-sea waters, France is leading the way, announcing in 2017 that more than 22% of French waters are covered by at least one MPA. Then, in May 2019, it announced that it wished to increase the proportion of its territory classified as marine and terrestrial protected areas to 30% by 2022 (compared with 20% today), a third of which are to be protected as “fully natural”. But what is this “surface area one-upmanship” worth, when Féral [3] observes that the increase in MPA surface areas comes at the expense of their normativity? And is an area that has been granted protection actually protected?

The effectiveness of MPAs is considered highly variable [1, 4]. In Ecuador [5], Colombia [6], Italy [7], Brazil [8], the Philippines [9] and elsewhere in the world, based on a review of research conducted on this subject [10], many studies question the effectiveness of the implementation of MPAs and the reality of their effects on conservation.³ Aichi Target 11 refers to “*effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures*”: in addition to quantitative targets are often-overlooked qualitative criteria. The pursued targets are themselves called into question: are the efforts to achieve these internationally set targets being made to tackle the loss of biodiversity or for economic reasons [11–13], security issues, or to assert territorial control [3, 14, 15], etc.? Case studies offer more nuanced responses, and generally, protected areas do indeed protect biodiversity “*but not exclusively, and not everywhere, insofar as countries’ strategies, management approaches and local practices may sometimes limit the scope of this objective*” [16].

Examining the effectiveness of MPAs – and above all, the conditions of their effectiveness – is crucial now that they are proliferating. While ecologists’ studies make the connection between MPAs’ effectiveness and regulatory [17], the social sciences are focusing on the question of MPAs’ legitimacy, understood as “*the ability of a political action, in this case an MPA, to be perceived as right and just by the various people who are involved, interested and/or affected by it*” [18]. Many studies show the determining nature of this legitimacy, in Mayotte [13], Malaysia [19] and Canada [18]. While some studies point out the existence of specific regulations [17], others insist on the conditions of respecting these regulations: in particular, they highlight the inclusion of local and fishing communities as elements that allow for both a better acceptance of MPAs and forms of social control of its uses [10, 20, 21]. This brings us back to challenging the way in which the ocean conservation effort via MPAs is assessed because effective protection only exists under certain conditions, and because classified marine areas are not necessarily protected.

More generally, discrepancies can be observed between the way in which MPAs are considered on the basis of a triptych (perimeter, status and regulations), and the way in which these three elements are experienced. What is an MPA? And in addition to its indications, how are the status, perimeter and regulations that constitute an MPA used in reality? To answer these questions, an international comparative analysis was conducted based on 13 case studies, in 11 countries. It brings us back successively to three founding illusions of MPAs described thus: (a). A status offers protection, the areas under this status being the key indicator used by decision-makers to highlight their conservation efforts: we will return to the long processes of institutionalisation and construction of the social acceptance of MPAs, which are often classified as such but which offer few protection guarantees

³ Questions relayed in articles with evocative titles in the professional press (“Are MPAs really protected”, *Le Marin*, 2019), general press (“Classified but not sufficiently protected marine areas”, *Le Monde*, 22nd October 2019) and satirical press (“Only the percentage was sufficiently protected”, *Le Canard Enchaîné*, 23rd October 2019).

until these processes have been consolidated; (b). MPAs offer perimeter-wide protection: returning to this idea, we will suggest a different way of assessing what is effectively under protection; (c) Protection relies on regulations established with the aim of being respected: understanding the mechanisms of the use of regulations in MPAs reveals a more complex reality in which the regulation is primarily a medium for dialogue with actors whose contribution is crucial for the conservation effort, and this leads us back to the idea both that the non-respect of the regulation is a flaw and to the idea according to which the conservation effort is proportional to the degree of MPAs' regulatory. We will therefore examine both the basis of MPAs and the way to assess how they contribute to the conservation effort. Having described our topic, the analytical approach and the selection criteria for the MPAs studied, we will then address in turn each of the three illusions that mask nuanced realities for which this analysis offers avenues to explore regarding the qualification and improved effectiveness of MPAs.

2. How are marine protected areas conceived?

More recently than on land, the creation of MPAs began in the 1960s and accelerated in the mid-1970s. Today, MPAs have become one of the key tools in ocean management, used throughout the world to protect species and habitats, maintain the functioning of ecosystems and ensure a sustainable use of marine resources [18].

An MPA is first and foremost a legal status intended to provide it with visibility, prerogatives and stable integration in the local institutional context. However, within a country, or from one country to another, statuses are extremely diverse. The IUCN typology [22] shows a gradient between “full protection” status (nature without humankind), the legacy of a Western school of thought that sets humankind against wild nature [23], and zones for “the sustainable use of natural ecosystems”, open for multiple uses, such as the Multi-Use Marine and Coastal Protected Areas in Chile. However, other points of differentiation exist, including either directly via conservation, or via fishery management (the Marine Fisheries Management Area in Cambodia, Extractive Reserves in Brazil). Behind the diversity of statuses is hidden the idea that a status can be considered as protection, an idea present in narratives in which classified surface areas are added up and considered protected. However, according to a global assessment of MPAs in 1995, only 29% of them achieved their objectives [24]. Jameson et al. [25] highlight two causes: their location, with MPAs subject to too many uncontrollable external influences (atmospheric, land- or ocean-based), and their management, limited by weak institutional and community-based capacities as well as inappropriate size with regard to the issues at stake. Furthermore, many MPAs throughout the world are qualified as “paper parks”, meaning that they are legally designated but do little for conservation [18]. If this status does not necessarily provide protection, what does it provide, and what role does it play (or not) in a dynamic to devise measures?

An MPA is then a perimeter and regulations. MPAs were initially thought of as a “setting aside” of maritime areas, with the IUCN having first defined them as “*any area of intertidal or sub-tidal 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*” [26]. The law, by means of regulations combined with zoning, is the primary “effective means” of action envisaged. The definition of MPAs evolved in 2008 when the IUCN assimilated them with Protected Areas (PAs) defined as “*a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to*

achieve the long term conservation of nature with associated ecosystem services and cultural values” [27]. Although it is no longer a question of “setting aside”, the use of legal regulations remains central: it is a constitutive element of MPAs along with the perimeter. With regard to perimeters, although it may be relatively straightforward on land, this geometrical vision of space poses various challenges at sea. Among the specificities linked to the marine character of an MPA identified by Day et al. [22] are the fact that boundaries are difficult to establish, that the protected elements are not always visible, that the scale of marine connectivity between ecosystems and habitats is vast, and that monitoring activities is made more complex by the fact that there are many more access points to a specific area than there are on land. Consequently, what is the reality of a perimeter and how should it be considered? An MPA is defined by its perimeter, and managed with the aim of achieving a higher level of protection than the areas surrounding it [28], but how, in reality, do managers come to terms with these limitations?

3. Material and methods

3.1 Case studies

Moving on from the way in which MPAs are conceived to how they are experienced involves going to observe them, which is what we did for 13 case studies. The case study is an empirical research approach that consists of investigating a trend, an event, a group or a set of individuals selected non-randomly in order to obtain a precise description and an interpretation that exceeds its terms of reference [29]. The aim is to identify patterns with a view to generating theories [30–32]. What both gives this its validity and makes it interesting is studying a trend (here the implementation of an MPA) without dissociating it from its context [29, 33]; attempting to understand how this trend functions through immersion in its constitutive elements [34]; combining several sources of data, encouraging the analysis of different facets of the same trend making it possible to corroborate or extend the analyses by causing new questions to emerge [31, 35]; and making it possible to identify unexpected trends [29]. Here we make a comparative analysis [33] of cases marked by the embedding of units of analysis (the territory, the MPA and its integration in the area, dialogue and confrontation concerning the project or that interact with it, and categories of actors). According to Musca [32], an embedded design makes it possible to share out the risks of closure of data access between several sub-units, which is a considerable advantage for our study. This approach is adapted for studying complex processes in public spaces open to multiple social interactions, as is the case for MPA creation processes.

According to Yin [33], the scientific rigour of the case study is based not on the use of a single type of dataset but on the combined exploitation of quantitative and qualitative data from various sources such as field studies, archive analysis, interviews, observations and so on. This allows certain data to be validated by triangulation [35]. Several sources were therefore mobilised for each case study, first analysing very diverse documents (management plans, maps, national conservation framework policy documents, scientific literature, and press articles describing conflicts), conducted prior to the field study based on records of in-situ observations, semi-directive interviews and sometimes participation in key consultation moments (in 4 cases). In total, 201 interviews were conducted, but their number varied depending on the case study from 6 to 28 (**Table 1**): while problems gaining access to stakeholders sometimes restricted the scope of the study, the number was above all determined in each case by factors such as the decisive or otherwise role of

| Name | Country | Size (Km ²) | Classified | Priorities/Conservation | Number of interviews |
|--|------------------|-------------------------|----------------|---|----------------------|
| National Marine Park of Zakynthos(NMPZ) | Greece | 134 | 1999 | <i>Caretta caretta</i> (loggerhead) sea turtle | 6 |
| Port Cros National Park (PNPC): core of park + membership area | France | 46/230 | 1963 | Marine fauna, Posidonia meadow, rocky or sandy beds, forest, avifauna | 23 |
| Multi-Use Marine and Coastal Protected Area of Isla Grande de Atacama (MCPA-MU-IGA) | Chile | 12443 | 2004 | Marine biodiversity, wetlands, fossils, geology | 13 |
| Tyre Coast Nature Reserve (TCNR) | Lebanon | 116,8 | 1998 | Birds, turtles, underwater archaeological sites | 11 |
| Gulf of Mannar Biosphere Reserve/Marine National Park(GMMNP) | India | 10500/560 | 1986 | Marine biodiversity: coral, sea grass beds, mangrove | 9 |
| Koh Rong Archipelago Marine Fisheries Management Area (MFMA) | Cambodia | 405 | 2016 | Coral, fish, mangrove, sea grass beds | 11 |
| Taeon Haeon National Park (THNP) | South Korea | 840 | 1978 | Beaches, sand dunes, landscape, 17 endangered species | 8 |
| Hauraki GulfMarine Park (HGMP) | New Zealand | 13900 | 2000 | Marine biodiversity, fishery resources | 19 |
| Moorea Marine Space Management Plan (PGEM) | French Polynesia | 50 | 2002 | Coral ecosystems | 28 |
| Multi-Use Marine and Coastal Protected Rapa Nui/Motu Motiro Hiva Marine Park | Chile, Rapa Nui | 150000/720000 | 2018/ 2010 | Coral reefs, fishery resources | 14 |
| Rosario and San Bernardo Corals National Natural Park (RSBCNNP) | Colombia | 1200 | 1974 | Coral reefs, marine biodiversity | 28 |
| Barra Do Una Sustainable Development Reserve / Litoral Centro Marine Park/Jureia Itatins patchwork of conserv. Units | Brazil | 14,8 / 4230 / 844 | 2013/2008/2006 | Atlantic Forest, mangrove, marine biodiversity | 11 |
| Saloum Delta Biosphere Reserve/National Park | Senegal | 1800/760 | 1981/1976 | Mangrove, marine avifauna | 20 |

Table 1.
Case studies.

national authorities, the heterogeneity of stakeholders, and points of view within each category of actors, the aim being to cover as well as possible the diversity of stakeholders' positions. Although almost a third of the people encountered were MPA managers (officials or elected representatives), our sample also included community and organisation representatives (22%), economic actors (20%), scientists (10%), sector administration officials (9%), and local authority officials or elected representatives (7%).

3.2 Selecting case studies

The case studies were selected based on the extent to which they displayed certain shared characteristics so that they remained comparable, and also to maximise the diversity of the situations observed. In our selection process, we follow Dougherty [30] according to whom the rule of selection should be the contrast: this encourages the revelation of recurrences in the way in which MPAs are implemented, and, here, how their components (status, perimeter and regulations) are seen. The diversity of the case studies should make it possible to see if we find similar processes and mechanisms despite the fact that the stakeholders, issues at stake and contexts (geographical, cultural and socio-economic) radically differ. Yin [31] talks of replications: according to him, in a comparative analysis approach, each case should be selected either to predict similar results (literal replication), or to predict contrasting results for predictable reasons (theoretical replication) [31].

The comparability of case studies depends on shared characteristics. The MPAs we selected were: (a). Subject to high or low but never inexistent anthropic pressure, open to various uses and characterised by objectives to use ecosystems sustainably; (b). Both coastal and marine, given that coastal areas are often strategic spaces in marine species' cycles and that managing land-sea interactions is crucial for MPAs to be effective; (c). Of significant size, with the smallest perimeter measuring 50 km²; (d). In existence for more than five years, in order to be able to observe a trajectory of institutionalisation.⁴ Then, to maximise situations, several geographical zones were selected (Europe, Asia, Oceania, Latin America and Africa), while at the same time choosing cases marked by the very variable levels of economic development and social capital of the human groups concerned. We also attempted to maximise the cultural diversity whilst still making sure the areas were comparable. The choice of three sites from the Polynesian arc thus aimed to compare the way in which MPAs contend with similar cultural references but in different ways depending on the countries. With the MPAs covering a variety of statuses, sizes and thematic approaches, these criteria were also taken into consideration: thus, our sample contained MPAs whose size ranged from 50 km² to 700,000 km², highly diverse statuses (marine parks, national parks, reserves, patchworks of conservation units, sustainable development reserves, fisheries management areas, etc.), the priorities of which were either directly to protect biodiversity, or to defend and manage a type of fishing in view of protecting both fishery resources and ecosystems. The case studies are presented in the **Table 1**.

The data collected were used to construct a chronological analysis and compiled into case study sheets to support a cross-sectional thematic analysis.

⁴ The case of Cambodia is an exception, but although the status was not obtained until 2016, the process began in 2011.

4. Results: What is an MPA? Three founding illusions

4.1 First illusion: classification offers protection

4.1.1 MPA status: an activatable capital

In seven of the case studies, the MPAs are granted management authority and specific regulations that define the “interior” and “exterior” of the MPA. However, in three of the cases studied, the statuses exist and the areas are considered to be Marine Protected Areas but they do not enjoy any specific protection. These MPAs have neither management authority, nor means of action or management plans for various reasons: (a). The studies conducted after classification and the management plan were never completed; (b). Local actors rejected the top-down creation of an exogenous MPA, and it cannot exist without their contributions; (c). The MPA received funding and existence, but funding per project was interrupted and protection measures no longer exist. Lastly, in three other cases, the protection measures and specific management regulations are subject to the mobilisation and agreement of third party bodies over which the MPAs have no hierarchical authority. This may be intended, as in the case of the Hauraki Gulf Marine Park (HGMP), New Zealand: with the exception of five small marine reserves that cover only 0.3% of its perimeter, the policy principle of the HGMP is specifically to try and influence sectorial or territorial administrative acts via a forum, in the idea that what they decide has more impact for the environment than any conservation policy carried out without them. However, it is not always intentional, as is the case for the Saloum Delta in Senegal, where the biosphere reserve has no authority over initiatives (outside its central zone, which is a national park) and depends on satellite initiatives over which it has little control. These third-party bodies may mobilise their support, as in Senegal where they give *de facto* content to the biosphere reserve, or not: in this case, the status offers no protection.

This illustrates the fact that a status does not offer protection *a priori*: it is activatable capital, which can be likened to a specific territorial asset [36, 37]. The status transforms a resource (i.e. a latent potential) into an asset, whose value for a conservation measure depends on the way it is – or is not – mobilised. It is a specific asset in that it is attached to this area and enables it to set itself apart. However, its creation offers no guarantee of its activation.

4.1.2 Thwarted institutionalisation processes: three key factors

Its activation (or otherwise) is the result of the MPA's institutionalisation process, which we will endeavour to reconstitute, and which often faces stumbling blocks of various kinds. Three major obstacles emerge from the case studies.

Funding by project may lead to activation that is either uncompleted or temporary. For example, it is uncompleted in Chile in the Multi-Use Marine and Coastal Protected Area of Isla Grande de Atacama where, after a funding phase of several years, neither the management plan nor the governance body nor the funding mechanism were stabilised. In Lebanon, the Tyre Coast Nature Reserve has management authority but so little funding that its actions depend on projects that are periodically activated. It is also temporary in India, where the Gulf of Mannar Biosphere Reserve was active for six years before its funding was slashed to a tenth, leaving only enough to maintain an office located outside the perimeter: here, the periods of activation and eclipse are of longer duration. The same is true for Senegal where the IUCN was the *de facto* manager of the Saloum Delta Biosphere Reserve

before withdrawing because of lack of funding: but in this instance, the conservation initiative was taken on by a diverse group of admittedly uncoordinated actors, some of whom joined in view of the stakes highlighted by the status, which thus contributes to revealing a specific environmental value.

Social non-acceptance is a second factor that hampers the activation of the specific territorial asset that the MPA status represents. In Brazil, the trajectory of the Jureia Itatins patchwork of marine and coastal conservation units provides a distressing illustration. In 1986, a full protection area was established thanks to the action of environmentalists who thus managed to put an end to property development and nuclear projects along the coast. However, its promoters had “forgotten” the long-established presence of a Caiçara population, literally attached to its territory and traditional lifestyle and activities, especially fishing. A conflict resolution emerged in the early 2000s thanks to a “patchwork of conservation units” that allows for the coordinated and contiguous existence of “full protection” areas and Sustainable Development Reserves (RDS) where the Caiçara population would be assisted to adapt its activities to environmental issues. However, while the fully protected reserve is unacceptable for the Caiçaras, the sustainable development reserve is unacceptable for naturalists, for whom the state of Sao Paulo acted as spokesperson by filing a lawsuit against this measure. The patchwork was created in 2006, cancelled in 2009 while the participative drawing up of a plan was underway, re-established several months later, suspended in 2013 by a new lawsuit and reinstated in 2014: to date, none of the patchwork’s conservation units has a management plan and the institutionalisation process has stalled.

In other cases, no process of this kind has seen the light of day, as in the example of the Motu Motiro Hiva Marine Park in Chile, an MPA granted a status and recognised as such. Rejected by the Rapa Nui community, which was not consulted despite its considering this marine area as its own, it is theoretically managed by the national fisheries department but has neither initiatives nor a management plan. Nevertheless, a “rebound effect” was observed: although this Marine Park remains inactive, the resulting conflict marked the “Rapa Nui’s social conservation boom” according to a community leader: the community appropriated the issue and took responsibility for the creation of an MPA. Admittedly, it is divided as to the form that this should take, but in 2018, obtained the creation of a Rapa Nui Multi-Use Marine and Coastal Protected Area.

Inter-institutional conflicts are the third major deciding factor in non-activation or de-activation and the relegation of a conservation initiative even if it has already been launched. In New Zealand, the Hauraki Gulf Marine Park is struggling to find its place in the institutional landscape. Intended to influence sectorial or territorial policies implemented on the level of the Gulf, it faces challenges from public administrations that deny it any legitimacy. This is the case for the Department of Fisheries, which defends exclusive prerogatives, refusing to consider its actions on a territorial scale while it manages fishery stocks, with a representative stating that the HGMP is “a small town that wants to influence a province”. The forum is also beset by divisions between representatives of the Tangata Whenua (Maori people) who want equal representation and elected officials who do not. In the background are conflicts between the Ministry of the Environment and the Fisheries Department,⁵ in addition to conflicts about democratic, representative, participative or customary legitimacy. This opposition caused the action to be suspended, but it bounced back to some extent elsewhere, beyond the field of the HGMP: a marine spatial planning mission launched by the HGMP and later suspended was taken up in its own right by an authority offering equal participation to the Tangata

⁵ Scott (2016) describes potential – and sometimes actual – conflicts.

Whenua. As for the situational analysis produced by the HGMP, this led to the setting up of a funding offer for environmental measures from the North Foundation. Here, again, the MPA status has not necessarily offered protection of the area, and the specific territorial asset it represents has not been activated: however, extensions exist that can be qualified as “rebound effects”.

In Cambodia, the institutionalisation process that was already well underway has been undermined by inter-institutional opposition. The Marine Fisheries Management Area (MFMA) created in 2016, run by the fisheries administration and an international NGO, risks being diluted in a Marine Park created in 2018 in the same zone by the Ministry of the Environment, with different objectives and without any consultation. And when the MFMA examined the idea of creating a tourist tax to fund the inspection of activities, the Ministry of Tourism pipped them to the post and created the tax for its own benefit. Everything that had been gradually constructed with local stakeholders has been undermined.

An MPA status does not, then, guarantee protection of the area involved because the institutionalisation processes of the MPAs are often disrupted. Three factors that hamper or suspend the activation of the potential offered by the MPA status in terms of conservation initiatives have been identified. Nevertheless, rebound effects sometimes occur that allow a certain activation, elsewhere, in a different way and/or via actors who are not MPAs, as illustrated by the cases studied in Rapa Nui, Senegal and New Zealand.

4.2 Illusion 2: the classified surface area is equal to the managed surface area

Measuring protected marine areas in each country takes into account the entirety of perimeters classified as MPAs in both political discourse and scientific literature [38]. However, even when the institutionalisation process is completed, a large proportion of the perimeter is not subject to any specific measures. Our analysis reveals the need to distinguish two perimeters rather than a single one, one for active protection and one for passive protection, the meaning of which we shall clarify using several cases.

4.2.1 The actively protected perimeter: various configurations

An actively protected perimeter is one where, on one hand, the management authority is proactive, and on the other, specific measures exist to tackle issues and pressures, exceeding the mere acquisition of knowledge. This perimeter is often only a fraction of the area classified as an MPA, with varied, linear or “patchwork” geographical configurations.

Patches may exist within the perimeter: for example, Moorea's Marine Space Management Plan is based on 8 no-take zones in addition to two regulated fishing zones and zones with various vocations (mooring, species' feeding grounds, cetaceans' resting grounds, etc.), but a large proportion of the perimeter remains under national law with no specific protection. In the Hauraki Gulf, these patches are very small no-take zones: five marine reserves with scientific, recreational and educational objectives as well as a temporary no-take area managed by the Maoris under fishery laws. These areas are the result of non-coordinated initiatives: the rest (over 99.5% of the perimeter) currently enjoys no actions or specific regulations linked to the MPA status. The actively protected perimeter may only be a single patch, as is the case for the case study in India where the central zone of the Biosphere Reserve is a National Park, monitored by rangers, and the peripheral zone is no longer the target of specific initiatives. This patch is sometimes limited to “whatever is left” after being whittled away despite the MPA. In Lebanon, for example, the Tyre Coast

Nature Reserve (TCNR) concerns both land and sea but its marine zone has neither regulations nor zoning nor specific initiatives and the TCNR includes a tourist zone besieged by pop-up restaurants each summer, a Palestinian refugee camp that is considered an entrenched camp and divides the North and South zones while its access road divides it from East to West, a border at risk of the construction of a motorway, zones used by farmers since the war and then a nature zone. The Reserve can only manage a very limited fraction of its perimeter, where it attempts to protect turtle nesting areas in particular.

Another configuration, this time linear, is the narrow, coastal strip such as the Taeanhaean National Marine Park in South Korea. Despite the MPA classification of a perimeter of around 326 km², 89% of which is marine, no zoning or specific regulations are connected to the park and it does not work in coordination with the fishing industry. An oil spill led it to monitor seawater quality, but its area of intervention is essentially a narrow ribbon along the coast: it offers services to visitors (car park, campsite, tours) and carries out interventions for developing coastal paths, dune restoration, coastal reforestation, urban monitoring, monitoring of the oil spill recovery and environmental education. This is due to the country's history. Its industrialisation, led by an extremely interventionist regime, has given rise to environmental conflicts about living conditions around industrial complexes: in this context, National Parks have been created as areas for relaxation and recreation for urban dwellers, hence the focus on highly organised and landscaped access to heritage that is both natural and cultural, with Nature seen as inspired and inspiring. The park is a place to recharge one's batteries and contemplate a scene from nature (to a far greater extent than to protect biodiversity), which is why its interventions are focused on accessible zones and "viewpoints", in this case, the coastal linear strip.

4.2.2 The passively protected perimeter

The actively protected perimeter therefore makes up only a fraction of the classified perimeter. Elsewhere, the MPA management authority is neither proactive nor even active, but the rest of the classified perimeter nevertheless receives passive protection that depends on the mechanisms that we will describe with the help of several cases. For example, in Tyre, the perimeter's classification as a coastal nature reserve, combined with Tyre's UNESCO world heritage listing, has repeatedly been used to oppose "artificialisation" projects: the status has thus been used by the International Association for the Safeguard of Tyre to contest the route of the South Lebanon motorway in 2002, 2005 and 2010 and to postpone this threat. It is passive protection: actors are seizing on the status to oppose a threat to the environment affecting the perimeter without the intervention of the MPA.

In reality, passively protected perimeters exceed the borders of the perimeter covered by the status, although it is impossible to assess the area precisely, as we observed in India, Colombia and Korea. In the vicinity of the Taeanhaean National Marine Park, the Korean Government wished to create a 520 MW tidal-powered factory, but clashed with the KFEM (the largest federation of environmentalist organisations) and fishers before accepting the zone's classification as a Marine Park. The proximity of the Taeanhaean National Marine Park was used in the arguments of opponents who claimed that the project would have consequences within its perimeter. In Colombia, the existence of the Rosario and San Bernardo Corals National Natural Park was used in the same way by naturalist movements to oppose the digging of a branch of the Canal del Dique which crosses the country transporting polluting products; building the branch would have threatened the Varadero Reef that lies on the northern border of the National Natural Park. This is also

passive protection that benefitted the asset without the intervention of the MPA. And lastly, there is the iconic case of India, iconic both because of the sheer scope of the project and the history of oppositions, the flames of which were fanned by the existence of the MPA. The brainchild of the colonial period, the Sethusamudram Project aims to dig an offshore canal to open up a shipping route to trade goods along the South East coast of India although today, the passage between India and Sri Lanka is impassable. After numerous disputes, in 1999, the State announced that it would complete the project in three years, then in 2005 announced the inauguration of the work, and approved the budget: but for the moment, the work that had started has come to a standstill because of opposition from various sources. These sources are religious (the route would affect Ram Setu, the causeway between India and Sri Lanka said to be built by the god Rama and his army of monkeys and a squirrel according to Hindu belief), socioeconomic (the state of Tamil Nadu reported the fears of fishers, and the Central Marine Fisheries Research Institute was concerned about the effects on fisheries resources), and environmental. It is interesting to note that the presence of a National Park and the Gulf of Mannar Biosphere Reserve (which the route is planned to pass through or close by) are systematically underscored in the arguments put forward. Despite the fact that to date, the Biosphere Reserve is almost inactive outside the central zone made up of the National Marine Park, its status is mobilised by various actors to protect the area. This represents passive protection.

Above all, the quantitative assessment of each country's conservation effort should take into account the surface areas under active protection, which are quantifiable, and secondly take into account the areas under passive protection. Without being strictly measurable, they can, at the least, be assimilated into the classified perimeter and nearby marine area.

4.3 Illusion 3: the regulatory illusion: are the rules meant to be respected?

4.3.1 When the level of protection is associated with the level of regulation

MPAs' effectiveness is often considered based on the legislative arsenal available to them. For this reason, Horta e Costa et al. [39] rank MPAs depending on the level of their regulatory protection, and qualify as unprotected any zones declared as MPAs when no legislative difference exists within and outside these zones for activities that may have an impact. The level of protection is associated with the level of regulation, making it an indicator that can "unambiguously distinguish the impacts of uses" ([39], p. 192). However, among our case studies, the most regulated MPAs are sometimes those where a culture of illegal harvesting develops, either from lack of monitoring or from the lack of alternatives for very vulnerable populations. More generally, simple observations in situ reveal that, whatever the MPA's level of institutionalisation, many regulations are not respected: does this render them meaningless? A more detailed analysis shows that managers distinguish between regulations that they insist are respected and regulations that are in place but not pursued in the event of violations, and instead used as a medium to inform, raise awareness or negotiate with those responsible for certain pressures. The reality is, then, more complex than a simple dichotomy between MPAs that are effective because based on regulations and MPAs that are not.

An initial approximation lies in the idea that an MPA without specific regulatory means is unprotected. Firstly, we observe that, among our case studies, if an MPA is a more regulated area than elsewhere, it is either because it is endowed with specific rules, or because it activates rules that are in force there as elsewhere, but elsewhere are neither known nor enforced. For example, in Moorea, the manager of the

Marine Space Management Plan strives to ensure that, outside the no-take zones, regulations are applied regarding the mesh size of nets, which remain ignored elsewhere but which are applicable on a national level. The same is true in Tyre, Lebanon: the city hall, which chairs the Reserve's management committee, carries out inspections to ensure that the prohibition of fishing with nets less than 500 m from the shore within the Reserve is respected – a regulation that applies everywhere, in theory. Generic regulations are revealed and activated independently of the existence of regulations specific to the MPA. Our case studies then reveal numerous mechanisms of collective self-discipline based on tacit conventions or self-regulation, which exist independently of any legal regulation: co-constructed with or without the MPA and appropriated by stakeholders, they are often far more effective than the law but invisible to the eyes of those who examine only legal regulations, such as Horta e Costa [39] and Zupan et al. [17]. For example, in India's Gulf of Mannar Biosphere Reserve, seaweed harvesters have established their own rules (it is forbidden to damage the coral reefs, to make fires in the mangrove, a 12-day period per month with no harvesting has been established, etc.), respect for which is based on social pressure and, in some villages, community-based surveillance. Trawl fishing has also drawn up rotation regulations in an attempt to limit over-fishing, and these regulations are respected without the need for a law. A second approximation involves the idea that the impacts of certain uses are reduced when covered by regulations: this assumes that, on the one hand, these rules are respected, and on the other, that they were established to be respected. However, comparative analysis reveals recurrences in the multiple functions attributed to the regulations, often used for dialogue purposes rather than to compel people to obey them.

4.3.2 To raise awareness, impose sanctions, establish dialogue and negotiate ... how regulations are really used

The MPAs studied in Greece, Colombia and France are consolidated and dispose of a specific legal framework and monitoring means at sea. However, all these case studies converge in two observations: everywhere, sanctions are rare, and the regulation is first and foremost a medium for dialogue.

In France, in one of the central zones of the Port Cros National Park, it has emerged from a specific study [40] that while 9,800 infractions were observed from 2010 to 2018 (offshore in 45% of cases), 97.3% of these infractions led only to verbal warnings and sanctions were applied in only 2.1% of cases: the regulation is primarily a medium for information and raising awareness, and it is mentioned in each annual activity report from 2010 to 2016 that the National Park's policy is to "favour information and awareness raising over sanctions".⁶

In Greece, in the case of the National Marine Park of Zakynthos (NMPZ), an observation survey enabled us to confirm the non-respect of mooring regulations, turtle observation distances and offshore speed limits, despite the fact that the NMPZ ensures that other regulations are respected, particularly those concerning the no-go zone. The massification of "3S" (Sea, Sand and Sun) tourism requiring recreational activities in the very same location as conservation issues has made it necessary to draw up regulations to share the area, and the NMPZ is managing to ensure these are respected: however, faced with the boom in demand, operators are showing an inventiveness that quickly renders obsolete the rules defined at any given moment. Henceforth, the manager chooses regulations on which he concentrates his inspections, while using the entire set of rules, respected or otherwise,

⁶ PNPC Activity Reports (2010, p.15; 2011, p.17; 2012 p.22; 2015, p.16; 2016, p.14).

as a negotiating tool to prevent the most serious infringements. Some regulations become part of a transactional game. When the NMPZ renounced enforcing a rule to prohibit mooring in a zone because of lack of means but also of alternatives to offer (it hoped to build a mooring platform but did not have the funds to employ the staff needed to run it), it was in order to focus on other offences and ensure the enforcement of regulations prohibiting access to crucial nesting areas. Certain transactions are more-or-less explicit, such as with professional fishing, where for ten years, a status quo was respected, and described as such by the protagonists: the respect of regulations concerning zoning in return for the lack of new restrictions. Dialogue recently began to change this status quo: the regulations are used as a medium for dialogue.

In Colombia, the Rosario and San Bernardo Corals National Natural Park (RSBCNNP) is also besieged by tourism described by its manager as “overwhelming”, with 1,300,000 visitors a year. Here, again, observation reveals that the PNN tacitly selects regulations that it enforces, renouncing others that are used as a negotiating tool. Admittedly, this is due to a lack of inspection means for the classified perimeter (despite 55 officials and the involvement of the national navy) but also, as in Greece, due to the marketing of a very attractive natural landscape that stimulates the emergence of new uses, creating uncontrollable situations.⁷ Lastly, from the point of view of the inhabitants, an excess of regulations are applied to some uses. Too many prohibitions without alternatives kill the prohibition, according to a representative of the Afro-descendant community and for whom, “as it is forbidden to fish both over there and here, I have only one solution, to fish where I want”: in his eyes, this sets illegality up to be the norm. Because it cannot be enforced, the regulation is a medium for negotiation, in this case, a highly conflictual one.

These three cases cover the diversity of the situations observed in our case studies, with regulations used either to inform and raise awareness, or to negotiate and, in this case, a tacit selection is made by the MPA between inviolable regulations and flexible regulations. The enforcement of regulations is then subject to conventions [41] that tacitly establish which rules are to be respected, which are negotiable and which infringements will be tolerated, with *de facto* prioritisation. Concerned with raising the awareness of its interlocutors and in the position of negotiator, the MPA endeavours to preserve an “area of potential agreement”, not breaking the thread of dialogue with those responsible for the greatest pressures on the environmental assets it intends to protect. This is a pragmatic choice in light of uncontrollable uses (that are prolific and evolving and/or prior to the creation of the MPA, and thus enjoy significant legitimacy), which can only be limited by negotiation that relies on regulations that do not involve sanctions. Thus, the MPA does not dictate regulations in view of ensuring that they are all respected, but does so in order to have a medium for dialogue and to negotiate uses.

Nevertheless, as we will see, in certain cases, one eventuality can be sanctions for their own sake, with a deviation from the rule to the detriment of both the most vulnerable populations and conservation. Negotiation is then used to legitimise regular and illegal harvesting by the authorities responsible for inspections either for private ends and/or to fund the inspections. In India, for example, in the Gulf of Mannar, what should be a “no-go zone” is qualified as an “open access zone” by a local scientist, concealing a permanent negotiation between seaweed harvesters and National Marine Park rangers. Locally, the authorities responsible for offshore

⁷ Playa Blanca receives more than 10,000 people per day, although its load capacity was assessed by the Park at 3,124 people per day. Located on the park's boundary, its tourist numbers lead to a proliferation of uncontrolled uses offshore and catering activities with no liquid waste management (Castaño C. A., 2016, *La debacle ambiental y social de Playa Blanca*, Opinión, 2016/12/29).

inspections evoke a “gentleman’s agreement”, which, if violated, leads to informal fines that are negotiated and adapted to the limited capacity to pay of groups that cannot be prevented from working in view of their vulnerability. Our interviews confirm the study conducted by Rajagopalan [42] that observed that, in a context of intensified inspections in the Biosphere Reserve, officials confiscated harvesting tools, which the offenders could retrieve if they offered “gifts”. The ICSEF, an NGO supporting fish-workers, made it clear to the community that it should demand a formal sanction rather than paying informal fines, but this has occurred only once since 2008. If the regulation is a medium for negotiation, the danger is that one of the results of its creation is to offer the possibility of negotiated and illegal harvesting of resources and taking from users, as Sundaesan [43] illustrated in a more urban context.

4.3.3 Recognising regulations’ real functions: their advantages and disadvantages

In all our case studies where the MPA has as its disposal a legal arsenal, prioritising regulations and their different uses is part of the normal functioning of an MPA that attempts an effectiveness that is impossible to envisage if dialogue with certain stakeholders breaks down. However, this is not without risk. In addition to the possibility of the illegal use of the regulation, its use as a medium for negotiation gives rise to unequal treatment at the expense of populations with the lowest social capital. Indeed, on the one hand, the effort the MPA must make to enforce a rule is all the more considerable since the offenders have social capital that allows them to curb its application, and on the other hand, this social capital facilitates negotiation: consequently, the rules are often applied differently depending on the public concerned. In Colombia, for example, in the RSBCNNP, islanders are banned from erecting artificial defences on the foreshore to protect themselves from coastal erosion. However, while the rule is enforced for local afro-descendant communities, it is enforced far less strictly for holiday homes and tourist enterprises (this is easily observed in the landscape), which travel to Cartagena to engage in dialogue with an administration whose language and logics they understand. This is the source of a sense of injustice, which is sometimes expressed with violence, as in the case when the NNP’s premises were vandalised on San Bernardo in 2018. The differentiated application of the rule is primarily the result of a differential of social capital from one public to another. It is crucial to acknowledge the reality of how these legal regulations are used, as much to counter the “regulatory illusion” as to control the eventual negative effects of these uses.

5. Discussion

5.1 Lessons learnt, scope and limitations of the comparative analysis

Lastly, it emerges from the case studies that MPA status does not offer *a priori* protection but constitutes a potentially activatable capital to aid conservation. Its activation depends on the MPA’s inscription process in the local institutional landscape, often hampered by factors such as funding by project, social non-acceptance, and oppositions between public organisations. We then observe that, whatever the MPA’s degree of institutionalisation, the actual scale of the protection initiative does not correspond to the classified perimeter. It is therefore necessary to take into consideration the area with effective protection rather than the area officially declared, with a level of active protection (where the MPA is proactive), which is a fraction of the classified perimeter, and then a level of passive protection, i.e. the classified

perimeter broadened to include nearby areas (where actors use the existence of the MPA to oppose potential threats to the environment). The case studies enabled us to observe the way in which legislative tools at the MPA's disposal are used. What emerges is the fact that the effectiveness of an MPA is not correlated to its regulatory and that the absence of regulations specific to the MPA does not mean that the MPA is ineffective. Firstly because MPAs might not create regulations but instead activate rules that exist but are not known and/or not respected, and then because having a considerable legislative arsenal signifies nothing about the way in which it is used. The case studies have enabled us to specify the way in which regulations are drawn up and used by MPAs, primarily as a medium for information, awareness raising or negotiation, with the advantages and biases inherent in these practices.

The scope of these findings is linked to the fact that they call into question a representation of the triptych (a status, a perimeter, regulations) upon which MPAs are founded: these three elements are, in fact, less specific and decisive than they appear to be, and it is worth analysing their role and outlines in each case. This representation forms the basis for the international assessment of each country's conservation effort, which we propose to reconsider. But can these findings be generalised from thirteen case studies? There is nothing representative about our sample, but the recurrence of the mechanisms is instructive: it is true that regulations are not used by all in the same way, but all the MPAs prioritise regulations that they attempt to enforce while other rules are above all used as a medium for dialogue, information and negotiation. It is true that the ratio between the actively protected perimeter and the MPA perimeter is highly variable, but these two levels rarely coincide completely. With regard to passive protection, it is meaningful in every case. In addition to these recurrences, the precise analysis of the mechanisms studied leads us to state that they exist in many MPAs. However, it would be worth completing this analysis with the precise assessment of actively protected perimeters, the estimation of passively protected perimeters and a more precise identification of the self-regulation mechanisms constructed in certain MPAs.

5.2 Measuring the conservation effort: propositions

The quantitative "one-upmanship" that marks the creation of MPAs, although criticised [For example, see 3], remains championed by countries as well as many NGOs.⁸ But it is based on assessment indicators of protected surfaces that our analysis contributes to challenging. In light of our analysis, we propose to measure them by taking into account mainly actively protected perimeters as defined on the basis of the analysis and which it is possible to quantify, and then passively protected perimeters, which could, by default, be assimilated with perimeters that are classified even if, in reality, they are slightly larger. Admittedly, this second level cannot be precisely circumscribed in that it depends on how stakeholders in environmental disputes seize hold of (or do not) the existence of the MPA – but it can be approximated. Furthermore, for a more detailed assessment, these perimeters should not be studied without examining the MPA's institutionalisation process, its degree of consolidation and what might constitute a threat to it: to do this, it would be useful to mobilise the indicators regarding the durability of the MPA's funding, its social acceptance, and the degree of adherence and convergence between public organisations with regard to this territorial conservation policy. Concerning the assessment of levels of protection within the perimeters under consideration, our

⁸ During the Global Forum for MPAs in 2017, current international commitments were described as the "minimum goal to be attained", the ambition being to protect "at least 30% of the world's seas" according to the IUCN, while the WWF asserted the need to raise this objective to 40%.

analysis also leads us to challenge a vision championed in certain political discourse (the “fully natural zones” proposed by the French presidency) and scientific studies [17, 39], according to which, the more uses with potential impacts are covered by a legal framework, the more effective the protection is: our analysis indicates that it is important both not to ignore the significance of systems of rules that are not legally recognised but adopted by stakeholders, and to examine the way in which legal regulations are effectively used.

6. Conclusion

Our comparative analysis based on thirteen differentiated case studies brings to light recurrences for protection levels and the conditions of the effectiveness of the conservation policies embodied by MPAs as well as the way in which they make use of (or do not) the regulations associated with their implementation. These findings run counter to the received ideas that form the basis for political discourse and decisions and some scientific studies according to which: (a). A classified area is protected ... and can therefore be recorded as such; (b). The entire classified perimeter enjoys protection; (c). Protection relies upon regulations drawn up with the aim of being enforced. When countries pledge to increasing the surface area of their waters classified as MPAs, they consider that the MPA status is a guarantee of protection and that it will provide classified perimeter-wide protection – two ideas that are called into question by this analysis. In light of this, considering two levels of protection, active and passive, gives us a clearer idea of both the reality of the protection measures and the extent of the efforts made by each country. Even so, however, quantitative objectives should not relegate qualitative ones to the background. Furthermore, it would be worth examining the role that regulatory plays in an MPA's effectiveness and efficiency. This is what we attempted to do by illustrating that firstly, an MPA can act efficiently to limit the impact of uses without necessarily having specific regulations at its disposal, and then that regulations are used in relations with stakeholders more than merely as instruments to exercise authority: when used to serve this relationship, they can prove to be more useful than when they are used to confront actors whose contributions are crucial to the MPA's effectiveness.

More generally, the findings of our analysis are an encouragement to examine more closely the way in which MPAs work and the conditions of their effectiveness. The three simple ideas challenged here are all illusions that lead to confusion, particularly for decision-makers who congratulate themselves for reaching quantitative objectives for creating MPAs without paying sufficient attention to the means they need to devote for their effective management and the success of their institutionalisation. What's more, these illusions mask the reality of MPAs: if the MPA status does not guarantee the protection of the perimeter under consideration, nor even its institutionalisation, and if the regulations associated with the conservation policies embodied by an MPA are not necessarily devised to be enforced, what exactly is an MPA? It is a local public policy that is constantly under construction (to be considered as a process rather than a state), marked by a dual level of action (active protection and passive protection), mobilising regulations that are first and foremost a medium for dialogue and negotiation.

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