

Carrying Capacity as a Tourism Management Strategy in a Marine Protected Area: A Political Ecology Analysis

Albert Llausàs^{a,b,#}, Josep Vila-Subirós^{b,c}, Josep Pueyo-Ros^{b,c}, and Rosa Maria Fraguell^{b,c}

^aDepartment of Geography, University of Valencia, Valencia, Spain

^bInstitute of the Environment, University of Girona, Girona, Spain

^cDepartment of Geography, University of Girona, Girona, Spain

[#]Corresponding author. E-mail: albert.llausas@udg.edu

Abstract

Natural protected areas are often required to concurrently support conservation and tourism development. Estimating the ecosystem's carrying capacity and setting up visitor access limitations is a common approach in maximising resource use to avoid environmental degradation. Our research used a case study strategy and a political ecology approach to analyse the conflict surrounding a carrying capacity-based management plan implemented in a Mediterranean marine protected area under severe pressure from scuba diving. A mixed documental and discourse analysis method based on fieldwork, grey literature and 16 semi-structured interviews with representatives of seven groups of stakeholders was used. Results indicate that although the carrying capacity approach was instrumentally supported by all groups, conventional scientific ecological knowledge played only a specious role in decision-making. Factors related to path dependency, neoliberal governance frameworks, uneven distribution of power among stakeholders and regulatory weaknesses were found to be the most influential in facilitating increased visitor pressure in the reserve. We conclude that, in order to be effective and mitigate social conflict, natural resource management strategies based on the carrying capacity concept must be complemented with a precursory assessment of the biopolitical context to align the goals of planning with the possibilities of the socially constructed environment.

Keywords: Carrying capacity, case study, commodification of nature, Medes Islands, natural resource management, neoliberal governance, scuba diving, tourism management, visitor cap

INTRODUCTION

Carrying capacity (CC) is often regarded as an inherent property of ecosystems that naturally sets limits on exploitative human activities, enabling us to achieve sustainable rates of natural resource use (Seidl and Tisdell 1999). As a concept, CC

was mainly developed in population biology and ecology to refer to the maximum number of individuals of a given species that a given environment can support without experiencing degradation (MacArthur 1955). It has been commonly used in the livestock and forestry industries to maximise production without endangering future yields, by constraining the number of cattle heads and tree density within the estimated productive potential of each parcel according to local environmental characteristics (Larsen 1995). Since the emergence of mass tourism in the second half of the 20th century, research efforts have been made to determine the human CC of destination countries, regions, natural protected areas and even monuments and sacred sites (O'Reilly 1986; Butler 1996; Vishal et al. 2016). In parallel to the more established biological or ecological CC, the term "social CC" emerged to describe the

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threshold above which the comfort and satisfaction of visiting and/or local people in a given space declines due to perceived crowding (Graefe et al. 1984; O'Reilly 1986). When translated into visitor management strategies and policies, the adoption of the CC concept has, for instance, led the government of Bhutan to impose strict travel restrictions and onerous entry fees to avoid tourist overcrowding, the city council of Venice (Italy) to install turnstiles to prevent tourist overcrowding along the canals during specific periods of the year, and the government of Victoria (Australia) to limit the number of visitors attending the daily “penguin parade” on the beaches of Phillip Island to not disturb the colony’s activity. In 1998, the Spanish authorities concluded that the maximum allowable visitor access to the parietal paintings in the Cave of Altamira was zero.

In natural resource management contexts, under a conventional perspective the duty of policymakers, conservation planners and natural area managers is simply to come up with the “magic number” that will maximise the use of resources without endangering future returns, a task that is often outsourced to people trained in the natural sciences (Adams et al. 2007). The idea is predicated on the assumption that natural ecosystems are stable over time and their condition remains unaffected by either changes in environmental conditions or by human action unless, that is, their intrinsic CC is exceeded, in which case they would rapidly degrade. Abundant scientific literature has challenged the validity of these assumptions, demonstrating the complexity of population dynamics in natural ecosystems – more so in times of global environmental change – and suggesting the need for a new paradigm or a “new ecology” that abandons the alleged notion of a natural balance and its associated CC and tipping points (Zimmerer 2000). The CC concept applied to human-environment relations has been very widely used, in tourism studies for example, but also frequently and intensively criticised (Butler 1996; McCool and Lime 2001). Its critics argue that, in addition to natural or anthropogenic daily, seasonal, long-term and even stochastic changes in the local environment that tourists visit, which alter its vulnerability and resilience, the behaviour of visitors is also changeable, almost down to each individual (McCool and Lime 2001; Brown et al. 2010). Other authors have noted how the determination of tourist CCs translating into access limitations in sensitive locations where a range of interests converge (biodiversity conservation, tourism business development, heritage preservation, spirituality, etc.) can cause social tensions and conflict (Few 2000; McCarthy 2002; Robbins 2012).

Despite its weaknesses, the simplicity and reassurances that the positivist science behind the CC approach offers managers and policymakers has made it one of the most commonly adopted tools in balancing conservation goals and tourism activities in natural protected areas worldwide (Butler 1996; Coccossis and Mexa 2017). Its proponents sustain that shortcomings in CC assessments and conflicts around them can be fixed by introducing more rigorous protocols: improving monitoring schemes to collect better

data with new sampling locations and increased frequency, introducing nonequilibrium ecology into models, including the study of visitor behaviours and stakeholder perceptions, applying the precautionary principle more strictly, etc. (Butler 1996; Collins 1999). In contrast, a constructivist approach to analysing the problems related to determining human CCs in natural areas invites not only reassessment of the technical procedures employed in the assessment, but that special attention be paid to the influence that stakeholders with differing views towards the environment, colliding interests and uneven power exert on decision-making and setting visitor caps. According to authors like Adams and Hutton (2007) and Robbins (2012), the political dimension of conservation policy must be considered when analysing natural resource management conflicts. Coincidentally, following their review of how CC is understood and used in a range of disciplines, Seidl and Tisdell (1999) conclude that the institutional and social dimensions influencing CC are underexplored across all fields. As a case in point, Gössling (2003: p. xi) extols the emerging field of political ecology as a suitable framework for use in tourism studies to address conflicts involving environmental conservation and tourism development.

This research adopts a political ecology approach to study the controversial implementation of a new CC-based management philosophy in a Marine-Protected Area (MPA) under severe stress from scuba diving activities. After years of struggle, a new regulation came into force in 2017 limiting the overall yearly number of dives in the MPA to 74,876, revisable on an annual basis. While all of the involved stakeholders welcomed the introduction of a revisable CC-based cap, approval of the system was delayed by the lack of an agreement between several parties. The two questions guiding the research were: how was the final figure of 74,876 dives reached? And why was it a source of conflict? To answer these questions, the research relies on a combination of documentary and discourse analysis, building on a grey literature review, public discussions and 16 semi-structured interviews. The goal of the paper is not to judge the suitability of the “magic number” – an exercise that, it can be argued, bears little promise of success – but to uncover the factors that explain the translation of widely agreed and apparently intuitive, straightforward, scientifically-based CC theoretical principles into unwieldy and conflictive practice leading to a result that is perceived by many as unfair. After the description of the case study and justification of the research methods that follow this introductory section, five groups of factors are identified and discussed in Section 4. The case study provides greater understanding of the possibilities and limitations in using the CC construct in the real and complex world managed by politically-charged societies, thus enabling a critique of the concept and its suitability for natural resource management in locations where tensions exist between conservation and tourism development goals. These outputs are presented in the conclusions section, together with proposals on how to foster a wider consensus around the scuba diving management model in the studied MPA.

THE CASE STUDY: SCUBA DIVING IN THE MEDES ISLANDS

The Medes Islands Archipelago (total area: 21.5 ha) consists of 7 small uninhabited islands (the largest just under 19 ha) clustered together roughly 1 km from the coastline of the Costa Brava tourist destination, in north-eastern Catalonia (Spain), in the Mediterranean Sea (Figure 1). The location is known for its rich submarine biodiversity, including an abundant presence of common spiny lobster (*Palinurus elephas*), dusky grouper (*Epinephelus marginatus*), red gorgonian (*Paramuricea clavata*) and precious coral (*Corallium rubrum*). Since the mid-20th century, the submarine environment around the islands has attracted a growing number of scuba divers. In the early 1960's, the first business specialised in bringing divers to the islands opened in the nearby port town of L'Estartit. Nowadays there are 11 accredited diving centres operating in the Medes Islands and the activity has become a pillar of the local economy, with yearly revenues of over €11 million and directly employing 200 people (7% of the total registered inhabitants in L'Estartit) in 2009. Most visitors to the archipelago come from France and the United Kingdom, have a medium or high socio-economic level, and are faithful to the destination, as 75% pay repeat visits to it (Palau-Saumell et al. 2018). The diving season in the area typically lasts from mid-March to mid-November.

In 1983, the Government of Catalonia promulgated a decree (Order 25/11/1983) forbidding fishing and any other extraction of lifeforms from the rich subaquatic environment in the immediacy of the archipelago. In the early 1990s, the emerged part of the islands and a perimeter encompassing 511 ha were declared a natural reserve (Law 19/1990 and Decree 328/1992), which remained independently managed by a small office until 2010, when it was integrated into the newly-declared Montgrí, Medes Islands and Lower Ter Natural Park (MMTNP) by Law

15/2010. In 2008, a Management Plan for the Islands reserve was approved (Decree 222/2008), limiting the daily number of licences granted to scuba diving to 446 (396 for businesses and 50 for private individuals), down from peaks of over 1,000 dives/day that had been registered in the late 1980's, when access was unregulated. Over the decade preceding the proposal, and according to official figures, the yearly number of dives in the MPA fluctuated between a low of 55,662 in 2012 and a peak of 62,713 in 2014. These numbers very likely make the relatively small and conveniently accessible Medes Islands MPA one of the most – if not the most – intensively and densely visited scuba diving spots in the world (Roncin et al. 2008). The accurate monitoring of visitor flows was facilitated by the introduction of a mandatory fee for each diving licence, now priced at €4.90. With the collection of this fee, the Natural Park raises between €300,000 and €350,000 every year, equivalent to 35% of its operating costs. In 2016, the MMTNP was awarded the European Charter for Sustainable Tourism in Protected Areas, which pursues the harmonisation of conservation goals with tourism activities and satisfaction of the local population's needs and European visitors' expectations (EUROPARC 2016). One of the strategic principles of the Charter is the regulation of tourist flows to avoid negative impacts.

The introduction of a protective regime and a *numerus clausus* on daily access are believed to have halted the degradation of the subaquatic environment that was evident thirty years ago. Nevertheless, biological and visitor behaviour monitoring programmes implemented by the Natural Park management team and a University of Barcelona marine biology research group found that many communities and slow-growth species still present a suboptimal condition (Linares et al. 2010; Ros and Gili 2015). In spite of the difficulties of identifying and measuring the factors contributing to this situation, most evidence attributes a large part of the responsibility to intense

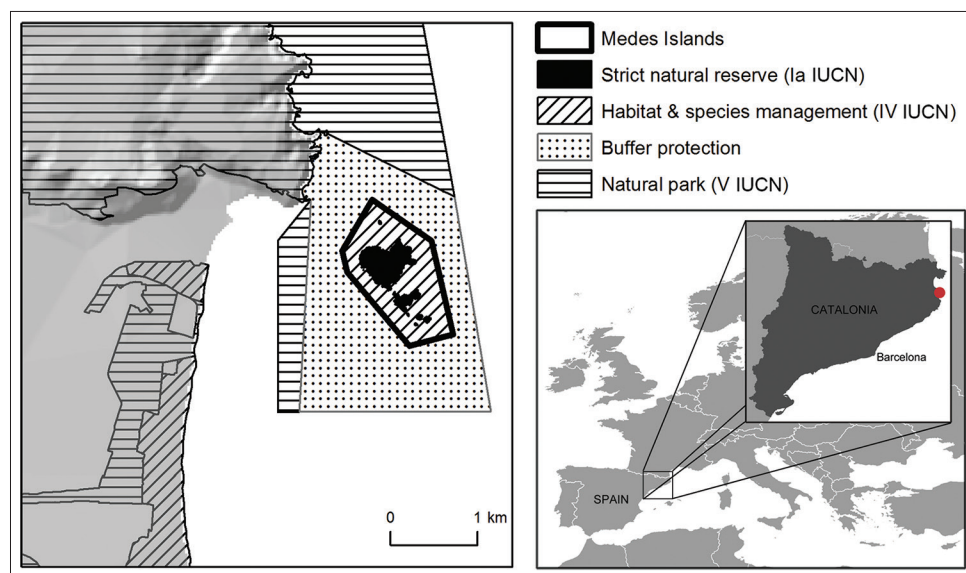


Figure 1

Location and protection status of the Medes Islands MPA (produced by the authors with data from ICGC, 2016)

human pressure, in combination with changes in the biophysical conditions of the environment derived from global warming (i.e., increased water temperatures, acidification, etc.), storm events, and the arrival of invasive species (Linares et al. 2010; Teixidó et al. 2013; Kersting et al. 2015; Ros and Gili 2015).

Tackling environmental degradation was the main stated motive leading to the approval of two new regulations, which were enacted by the Government of Catalonia and came into effect in 2015 and 2017 (Order AAM/112/2015 and Decree 1005/2017). These regulations introduced a new approach to managing visitor access to the Medes Islands MPA, based on biological and social CC. Two important procedural changes were introduced. First, the counting of visitors and proposed management actions would no longer be conducted and planned at an MPA-wide scale, but according to a zoning plan that differentiated between 13 areas, with different ecosystems and resilience to impacts. Second, access limitations would be put in place on a per zone and per year basis, instead of the aggregated daily cap system that had previously prevailed. A monitoring scheme was to be implemented to measure biological change at each location (including the islet of Medallot, where a no-access policy was enforced as a reference sample point) and correlated with visitor pressure, enabling a revision of the allowed access quotas at the end of each tourist season. In accordance with the limits of acceptable change method, the cap would be increased if an improvement in conditions was consistently recorded for at least four monitoring campaigns in a row, or decreased if degradation was observed to have occurred in the previous months (see also: Bentz et al. 2016). Similarly, the number of concurrent scuba divers in each signalled diving location was regulated to avoid the perception of crowding and increase user satisfaction, thus making the framework sensitive to the social or psychological CC threshold (see also: Szuster et al. 2011). Potential damage caused by inadequate visitor behaviour was addressed by introducing the obligation for every group of 8 divers to be accompanied, trained and supervised by an accredited guide. With the actual deployment of the new management system, the number of mooring buoys was increased from 12 to 16, opening access to four previously unexploited diving spots, and the total number of allowed dives per year fell from an initial proposal of 77,012 in a preliminary 2015 draft released for public consultation to 76,151 in a second draft of 2016, finally being set at 74,876 in the approved 2017 decree.

METHODS

In political ecology, case study research strategies are frequently employed to obtain a “thick description” (c.f. Peet and Watts 2004) or a succinct narrative identifying the biophysical and socioeconomic drivers behind environmental change at local and regional scales, and how they interact to explain the observed outcome (Robbins 2012). This is particularly true of case studies addressing conservation efforts or studying environmental degradation processes derived from human activities (Adams et al. 2007; Robbins 2012). In both cases,

researchers must provide an accurate account of biophysical transformations, but they must pay special attention to the social and political environment under which they take place. Accordingly, it is important to understand which stakeholders are involved in decision-making, which are conversely left out of decision-making platforms and for what reasons, the interests and “environmental imaginaries” (c.f. Peet and Watts 2004) of each group or individual, and how each of them uses knowledge, power and discourse to influence other stakeholders and affect decisions (Escobar 1998; Few 2000; Adger et al. 2001; McCarthy 2002).

Qualitative and mixed-methods approaches are common methodological choices when addressing the in-depth study of cases that demand researchers to gather and analyse very different types of information from multiple sources, as is customary in political ecology studies (Turner and Robbins 2008; Creswell 2013). Our study of regulatory changes to the Medes Islands MPA adopted a mixed-methods approach combining documentary and discourse analysis following a period of intense fieldwork conducted between February 2016 and December 2017.

A database was created to archive various types of documents and media. Laws and decrees in force for the period 1983-2017 and addressing the regulation of human activities in the study area were gathered. Preliminary versions of recent regulations released for public consultation purposes and, in some rare cases, unreleased drafts, were also obtained. Scientific papers and reports from scientific institutions addressing the ecological condition and environmental impacts were also compiled. Journalistic chronicles appearing in newspapers and television programmes were collected, as well as opinion pieces written by involved stakeholders and broadcasted debates in which they participated. These different forms of grey literature were obtained from public administration repositories, academic databases and targeted queries on the websites of six newspapers, one periodical journal and one TV station, covering the period January 2014 - December 2017.

Views and opinions were sought from a variety of stakeholders with repeated observational visits to the study area, notes being taken at two public debates that were organised – one by the Catalan administration and one by a regional environmental NGO – to present and discuss the new regulations, and 16 semi-structured interviews were conducted with interested parties (Table 1). Participants were selected based on their holding positions of responsibility, their active involvement in opposing the changes or their recognised expertise in the tourism-related or biological dimensions of the local aquatic environment. All approached individuals were male and all agreed to be interviewed face-to-face, except for three who were contacted online for a videoconference. In accordance with the EU standards for research in social sciences, all participants were formally informed of their rights and the confidentiality conditions of the research. A set of 24 questions addressing the historical trajectory of the MPA, its biological condition, tourism management strategies and participatory and decision-making processes was slightly adapted to fit

Table 1
Number and profile of interviewees by sector

Sector	Number and profile of interviewees
Administration	1 Government of Catalonia, Directorate of Biodiversity and Environment
Sector Policing	1 Girona Province Catalan Rural Police Officer 1 Girona Province Spanish Coastguard Officer
Natural Park	2 Natural Park directors (2014-2016, 2016-) 1 Member of the Executive Board
Fishermen	1 Board member of L'Estartit Fishermen's Union
Scuba diving businesses	1 Board member of the Subaquatic Tourist Centre Association 1 Owner of a diving centre specialised in large groups 1 Owner of a diving centre specialised in small groups 1 Scuba diving instructor
Scientific community	2 Researchers from the University of Barcelona (1 active, 1 retired) 1 Researcher from the Autonomous University of Barcelona 1 Researcher from the Spanish National Research Council
Environmental NGO	1 Member of the Naturalist Association of Girona

the profile of each interviewee. During the conversation, the interviewer would freely decide to invite the interviewee to expand on his answers beyond the strict focus of the research or formulate new questions. The interviews were conducted during the spring of 2016 by one of two senior researchers trained in qualitative research methods. They lasted between 30 and 55 minutes and were audio-recorded with permission. Verbatim transcriptions were created by the lead author.

Qualitative data analysis software was used to encode and analyse documentary evidence and interview contents. A process of thematic coding of 457 segments enabled the identification of five emergent categories in the data, which were iteratively re-coded into more specific hierarchical sub-categories (Guest et al. 2011). In accordance with the thematic coding method, the crystallisation of five categories to structure the data was discretionarily adopted by the research team. Nevertheless, it is relevant to acknowledge that, at the end of the process, all relevant data was retained and classified. The first-level category "Carrying capacity" coded documental evidence of how biological and social CC was determined and interview segments on the meaning of the CC concept and its suitability. "Conservation policy" focused on how the different parties interpreted the purpose and functions of the MPA and using CC thresholds as a management tool. "Stakeholders and institutions" contained segments related to the social organisation of groups and interests around the MPA. Under the label "Power", evidence of how each stakeholder defended their views was recorded, including the type of capital that provided him influence or bargaining capacity. "Participation" was the suitable category for segments referring to consultation, discussion and negotiation processes that involved most, but not all, of the stakeholders in the determination of a suitable CC-based management approach.

The reading and re-reading of data advised by the iterative approach facilitates the identification of patterns, collusions and links between segments coded in the same or different sub-categories. These serve as the basis to develop the ensuing analysis and discussion of factors influencing decision-making.

FACTORS BEHIND THE '74,876' CONFLICT: ANALYSIS AND DISCUSSION

The exploration of how CC was articulated as a limit on allowed yearly dives led to the identification of 5 groups of influential factors. Each group is described in a corresponding subsection, presenting the evidence supporting its classification as a meaningful determinant and including, where appropriate, a discussion of the different stakeholders' discourses and position on each matter. The 5 groups cover issues regarding the degree of support accrued by the CC philosophy among stakeholders, the historical background, the governance model under which decisions were made, the unevenness of power among stakeholder groups and the consequences of non-compliance with the new regulation. Relevant literature on each topic has been included in the text to compare findings and put them in perspective regarding previous advancements.

Wide Stakeholder Support in Theory, but not in Practice

Stakeholders' positions regarding the adoption of a revisable CC-based limit on the number of dives is best assessed by analysing the discourses reflected in the content of the interviews, debates and newspaper pieces. A superficial review of this material suggests that there was unanimous support for the strategy. All groups agreed that setting a maximum number of visitors and adapting it to changes in the environmental condition would be a positive development from the pre-existing inflexible management model based on daily restrictions set in the early 1990's and widely regarded as arbitrary. This consensus is likely to have played a pivotal role in the decision by the competent administration to adopt the CC-based management model in the MPA as, regardless of its effectiveness, it would guarantee the absence of opposition, social conflict and the eventual loss of political capital.

Nevertheless, a deeper analysis of the discourses reveals significant disagreements regarding the purpose and opportunity of a revisable strategy. Officially, the main purpose of the new approach, as stated in Decree 1005/2017, was to improve the ecological condition of the subaquatic environment of the MPA. This goal was reiterated by the representative of the Catalan administration that promulgated the decree and, using very similar wording, it was supported by the scientific community and environmentalist groups. However, for many groups, the real motivation behind the strategy was to introduce regulations for activities such as snorkelling and free bathing, which had only started to take place in the Medes Islands in recent years and were not addressed in the 2008 plan. This view was shared by two representatives of the Natural Park, one of the representatives of the policing sector and widely

supported by all interviewees in the scuba diving business. Most of the interviewees in this latter group conceded that, for them, the main reason to support the CC-based update of the regulation was the opportunity to increase their efficiency with the replacement of a daily-cap with an annual cap. Businesses had long complained that a daily limit did not allow them to fully exploit their theoretical share of visits, as unused quotas in low-season months or bad weather days could not be carried over to upcoming trips. The representative of the Catalan administration admitted that diving centres' demands on this matter had also influenced his office in shaping the new plan.

However, businesses did not share the stance of the other stakeholders regarding the convenience of an annual revision and its translation into changes in the per-zone limitations. While all other groups believed that as long as a suitable monitoring scheme was put in place, the revisable system would allow visitor pressure to be adjusted to environmental conditions, the president of the Subaquatic Tourist Centre Association and the owner of a diving centre specialising in large groups saw an opportunity to demonstrate that tourism activity is only a secondary driver of degradation, behind other factors such as increased water temperatures, acidification, storms, etc. If comparing the results of monitoring the visited areas and the no-go reference reserve of Medallot islet proved their point, there would be no reason not to increase visitor access and they would potentially benefit from it.

Authors such as Abernethy (2001), Adams and Hutton (2007) and Walker (2005) have explicitly addressed the profound divide allegedly separating biological scientists, natural science-trained conservation planners and environmentalists on the one hand, and social science-trained conservation critics and liberal entrepreneurs on the other. The first are often portrayed as faithful believers in the deterministic correlations offered by positivist science and neo-Malthusian theories like the human CC concept. The latter tend to be represented as irrational negationists of the exhaustibility of natural resources, the existence of CCs, and enemies of nature. In the case of the Medes Islands MPA, no dogmatic adherence to either conception of CC is observed. The idea of CC and its extension as a management tool was instrumentally appropriated by all stakeholders in the hope of advancing their own interests. This was perhaps most obvious in the cases of the administration (which used CC as a source of legitimacy and consensus) and businesses (which saw it as an opportunity to maximise their activity and transfer the responsibility of environmental change to exogenous factors). While environmental NGO's and the scientific community formally upheld a simplistic, politically-neutral and aseptic adherence to the CC concept, their discourse frequently revealed a sentimental investment in the conservation of the area, probably a result of seeing the conservation of the local environment and the location where some of them had been working for more than 40 years threatened. This indicates how even groups that are sometimes simplistically depicted as being fully committed to objective knowledge and reason are, in fact, influenced by cultural values and environmental

politics, as they are naturally part of society and not detached from it (McCarthy 2002).

Despite the observation that stakeholder consensus was brought about by instrumental interpretations of the CC concept, achieving a widely agreed philosophy for natural resource management in the MPA is a valuable achievement in itself. However, the way support around a CC-based approach was converted into a practical management tool did not satisfy the opposed interpretations and expectations of various stakeholders. Environmentalist groups and scientists criticised the fact that the final figure of 74,876 allowed dives had not been determined by scientific methods, was arbitrary, and did not respect the precautionary principle.

The Weight of the *Status Quo* and Path Dependency

Over the last four decades, events surrounding the protection and management of the Medes Islands and the wider local area have contributed to producing the current CC-based model and even established some pre-conditions for adoption of the final figure of 74,876. They can be summarised as two different but interconnected dynamics: delimitation of the socioecological system and the type and intensity of activities allowed in it.

In line with the dominant conservation paradigm of the times, a fortress-like natural reserve model was progressively established in the Medes Islands between 1983 and 1992 (Vaccaro et al. 2013; Ros and Gili 2015). This move entailed delimiting more or less discretionary yet clearly defined administrative boundaries around the MPA in what would otherwise be a homogeneous and massive marine environment. The original 511 ha delimitation has remained unvaried, although it has been categorised under different protection regimes over successive periods. The delimitation has provided a convenient simplification for defining what constitutes a "natural unit" or isolated socioecological system, which therefore ought to be protected and managed in accordance with its intrinsic CC. Had the limits been drawn up differently in the 1980's, it is very likely that the area considered to merit protection and visitor management strategies in current times would have followed suit. In fact, some stakeholders are adamant that the coastal cliffs of the Montgrí massif deserve the same level of protection as the submarine environment of the Medes Islands and the reserve should have been extended. Furthermore, had a different protection or exploitation strategy been put in place since the 1980's, perhaps one based on the joint management of resources or a neoliberal paradigm without institutional intervention or boundaries, it might have been impossible to establish a CC-based scuba diving regulation in the area recently. As noted by some interviewees, one weakness of the 2017 strategy is that it equates the defining of administrative borders with the boundaries of an allegedly closed natural system, whereas in reality many species can freely move in and out of the designated area and all of them are subject to global environmental changes.

A second effect of creating a reserve in a traditionally exploited area is the exclusion of certain activities, groups and a

concomitant re-organisation of land use rights and legitimacies. As in so many other newly established natural protected areas, parties advocating for designation of the archipelago resorted to conservationist discourses to demand and justify the introduction of protective policies. Extractive activities and excess scuba diving, it was argued, were damaging and threatening the survival of the rich aquatic wildlife. Under this premise, a dozen boats in L'Estartit port that had been using the islands as a productive fishing ground were denied access to the MPA. Documentary archives prove that the restriction was unpopular at the time, and it was met with protests and hostility by the fishing sector. However, the research has found that nowadays the last remaining traditional fishermen in the port are largely detached from debates around the management of the islands. Furthermore, they have to some extent incorporated into their language the narrative that deems protection of the archipelago a necessity given the threats that it was facing at the time and its conservation success nowadays. However, this narrative, promoted by the government in its documents and through an advertising campaign, was even contested by a director of the Natural Park, who admitted that, "In the end, we need to compromise, it [the Natural Park] is not a sanctuary, it is a different type of park, it is difficult for coastal parks to be sanctuaries". The quote refers to the fact that, with the government gaining full control of the MPA and the destiny of its resources, it chose to grant exclusive exploitation rights to a handful of pioneering scuba diving centres that obtained a licence to operate in the MPA. As other authors have noted, it is not rare for conservation policies promulgated by centralised authorities affecting valuable natural areas to favour tourist use of the environment over other uses or strict environmental protection (Davis and Tisdell 1995; Collins 1999; McCarthy 2002; Oracion et al. 2005; West et al. 2006).

In the case study, the decision to develop a tourism sector around the MPA instead of a nature sanctuary or allowing fishing and extractive activities has greatly influenced the path followed by local development in the municipality, a fact that has greatly conditioned the current management scheme and the cap that was set. With the aforementioned employment and turnover figures generated by scuba diving activities in the reserve, combined with ongoing heavy public investment by the local, Catalan and Spanish governments in arranging a leisure port and associated tourism infrastructure, it is clear that a large proportion of the local economy is dependent on sustained tourism. This observation is further reinforced by a statement appearing in one of the early drafts of the decree project open to public consultation, which stressed that the quantification of the visitor CC should "take as a reference the results from marine monitoring and information on the number of dives over recent years". The latter part of the statement was removed from subsequent versions of the decree. The final cap did not use previous average records of 60,000 visitors/year and – much to the dismay of the scientific community and the disappointment of conservationists – it proposed increasing potential pressure by adding some 14,000 visits annually. The fact that this change took place against the explicit advice

not only of the scientists involved but also the consulted independent advisory bodies demonstrates how far the current development pathway is locked into the community around the MPA. So much so that the competent authority's commitment to maintain the *status quo* established in the 1980's is strong enough for new policies to over-rule scientific criteria and disregard methods for tourist CC quantification (Canestrelli and Costa 1991; Collins 1999).

A Neoliberal Governance Framework in Action

Many political ecologists have identified a growing influence of neoliberal principles over how conservation is conceived in policy and implemented in planning (McCarthy and Prudham 2004; Adams et al. 2007; Robbins 2012; Vaccaro et al. 2013). For Fletcher (2010), some of the basic premises of a neoliberal approach to conservation are the commodification and privatization of natural resources, the creation of capitalist markets for resource exchange and consumption and the decentralization of resource governance to local authorities and non-state actors. Given that, according to Gössling (2002: 540, citing Urry 1995) "Tourism is increasingly built on the marketing of nature and natural resources, which have become its central elements", it is not surprising that the debate around visitor management in the Medes Islands MPA was influenced by the dynamics identified by Fletcher. Specifically, it is possible to contend that the adoption of a CC-based management model and the resulting cap were influenced by a neoliberal governance framework in various complementary ways.

While the existence of a delimited MPA where tourism activities are allowed contributes to the commodification of nature by clearly defining what constitutes a product for tourist-only consumption, the establishment of CC-defined maximum visitor quotas attributes exchange value to each dive and creates a competitive market for them (Gössling 2002; Castree 2008). Actors in this market include the administration as both regulator and beneficiary, and individual scuba divers, businesses focused on bringing large groups to the MPA at affordable prices, and businesses specialised in smaller groups looking for a more intimate experience, as consumer groups competing for a limited supply of licences. Theoretically, the market also includes groups with protectionist agendas, as nothing prevents them from participating in the exchange by acquiring licences and then not exercising the rights of access to the MPA.

The market that was created by applying the CC concept in the Medes Islands MPA offers two mechanisms for manipulation. First, the supply of diving licences can be changed. The aim of the annual cap revision mechanism is to allow visitor pressure to be adapted following observed changes in environmental conditions. Since change in the environmental quality of the reserve depends to a great extent on human action, the enhancement of anthropic activities offers an effective way for the market to expand supply and, therefore, its penetration. This is pursued in the new decree by targeting improvements in visitor behaviour via increased supervision of diver groups,

the mandatory holding of “ecobriefings” prior to the dive and slightly increased patrolling to avoid poaching and curb illegal diving. The introduction of these measures was generally favoured by all interviewed stakeholders, reflecting what Abernethy (2001: 9), among others, characterises as a feature of a neoliberal view of natural resource limits: a certain belief that “Technology and market mechanisms [...] will always enable humans to overcome putative natural limits” (Adger et al. 2001). The second market-manipulation mechanism is the pricing of licences. The aim of the policy in this regard was evinced by the current director of the Natural Park: “It is a matter of markets, the market will decide: maybe the price for going to one zone, to a buoy, will not be the same as for going to another zone. [Access to] one of the locations will be more restricted, only small groups will be allowed, they will have to comply with certain conditions, because it will have an added quality that other locations do not have”. The use of pricing mechanisms as a form of self-regulating demand and supply is a core principle of the neoliberal doctrine, in this case applying to natural heritage commodified as either a tourism resource or a premium tourism resource (Gössling 2002; Fletcher 2010; Vaccaro et al. 2013).

The autonomy of the Natural Park management to introduce pricing barriers as a method to curb demand until the determined CC limits are met was guaranteed by a formal and informal transfer of decision-making and regulatory power from the Catalan government to selected local stakeholders. This characteristically neoliberal step had, in turn, two important consequences that explain how the limit of 74,876 dives per year was achieved and visitor access increased. First, it opened the door for the Natural Park management team to generate much-needed additional revenue in times of economic austerity policies that were affecting the environmental third sector more than any other (Duque Romero 2015). This created an incentive for the Natural Park’s board to increase the number of paying visits to the MPA, regardless of CC considerations. This observation is a reminder of the perverse effects that the externalisation of funding natural protection from state or state-like public authorities to private interests or non-governmental organisations can have for the environment (Fletcher 2010; Sullivan 2013). Second, the devolution of power to local stakeholders did not include mechanisms to ensure an even representation of all interested parties, and hence decision-making reflected the existing power imbalances and even led to the exclusion of some voices. The effects of this deficit are further discussed in the following sub-section.

An Uneven Negotiation

The provisions in the 2015 and 2017 legislative texts implementing the new management plan in the MPA were the sole responsibility of the Catalan government. However, complying with public participation regulations, interested parties had the opportunity to share their opinion on early versions of the proposals and suggest amendments. Furthermore, the administration actively sought the participation of certain

stakeholders and privately met different parties in the hope of achieving a consensual strategy. Nevertheless, these efforts did not ensure the engagement of all groups nor did it concede the same consideration to all voices.

The most notable absence observed during the decision-making process was representation of the wider local community or civic organisations. Two different factors might explain their absence. It is likely that, given the characteristics of a marine reserve (relatively hidden underwater, distant from residential areas and separated from them by water), local groups that had otherwise been actively engaged and very vocal regarding other land-use planning provisions affecting the nearby landscape felt alienated from the possible impacts of the new regulation. Conversely, it is conceivable that, in a local economy so dependent on the scuba diving industry and associated activities (accommodation, vehicle rentals, restaurants, etc.), most people in the local community perceived a potential benefit in the expansive plan, thus not feeling the need to become involved with discussions surrounding it. It is also noticeable that the only vocal collective within the scientific community were marine biologists, whereas experts in the social sciences (e.g., geographers, economists, etc.), who would have potentially held different perspectives, were absent from discussions and negotiations despite their relevance to land use planning and socioeconomic development.

Among the groups that were involved in the decision-making processes, significant differences were observed in their capacity to influence the regulator, reflecting both an uneven distribution of power, urgency, and legitimation and an unequal effectiveness of the discourse mobilised by each stakeholder (Mitchell et al. 1997; Bixler et al. 2015). Three indicators of power imbalances might help explain why the resulting limit of 74,876 was well above recent-years records. In the first place, the Natural Park council in charge of supervising the activity of the technical office, controlling budgets and approving the strategic direction of management, contains a wide majority of representatives from public institutions and the private sector (20 and 15 out of 40 seats, respectively). Overwhelmingly, these groups have long held that the main function of the Natural Park is to certify and promote the area as a sustainable tourism destination. Scientific institutions and environmental groups constitute a clear minority on the council (3 and 2 out of 40 seats, respectively). The second indicator is an individual, the owner of one of the largest diving centres in L’Estari, a long-time advocate of facilitating access to the Medes Islands, recipient of multiple fines for bringing scuba divers without a licence to the MPA, board member of the Subaquatic Tourist Centre Association and local government councillor. The influence and connections of this key individual, who has amassed personal, sectoral and public interests, might help explain the origin of the third indicator of power bias: the option that was given to the diving industry in L’Estari to decide whether the CC cap should be established on a per-day or per-year basis. No other stakeholder was granted the privilege of deciding such critical aspects of how the CC concept should be rolled out in the regulation. Sadly, the words

expressed by Reed et al. (2009) following their review of the development of stakeholder analysis practice resonate for this case study: “[...] there is a danger that particularly powerful and well-connected stakeholders can have a greater influence on decision-making outcomes than more marginalised groups; a problem that is especially acute in development projects”.

Irrespective of power distribution imbalances, the arguments, narratives and discourses invoked by the different stakeholders to defend a more generous or restrictive visitor cap were found to be significantly different. Proponents of allowing increased access to the MPA resorted to defending the economic and job creation benefits of such a move for both the tourism sector and the wider local community. This contrasted with critical discourses held by environmental NGO's, the scientific community and, less intensively, park rangers, whose arguments reflected concerns about the impacts that an escalating degradation of the MPA would have for biodiversity conservation efforts beyond the local level and on a regional and global scale. They focused on the long-term sustainability of the reserve, used highly specialised scientific language and terms and raised concerns related to overcrowding, user satisfaction and the social CC of the MPA. A common feature observed in all stakeholders' discourses was the widespread internalisation of what Fletcher (2010) calls “neoliberal environmentality in natural resource policy”, insofar as all groups expressed an interest for the long-term *in situ* preservation of the subaquatic environment in the MPA to ensure that the current tourism model can continue in the future.

The process of debate and negotiation that led to the final visitor cap also resulted in some interesting observations regarding how the CC concept is operationalised in practice. Authors such as Adams and Hutton (2007), Blaikie (2001), Meltzoff, Lichtensztajn and Stotz (2002), Simsik (2002), Vaccaro et al. (2013) and Zimmerer (2000) all assign a prominent role to biological and ecological scientists in defining conservation policies, usually as a way of demonstrating the need for other groups and types of knowledge to be incorporated within decision-making processes. Implementing an MPA management strategy based on measuring the CC of the environment and revising it according to a biological monitoring scheme was supposedly a fitting context for a scenario in which the scientific community - having prospected the area for over 40 years - would have a prominent role. Nevertheless, this scenario did not materialise. Accusations against the scientific community of vested interests, a lack of objectivity and of being conservationists-in-disguise meant the legitimacy of scientific knowledge to determine the visitor pressure that the MPA was capable of supporting was being questioned. Even after all stakeholders formally embraced the CC concept and objective scientific guidance as management tools, government agencies and the scuba diving industry were the only parties that produced actual numbers and put forward quantified per-zone limitations. Generic calls from all of the scientists involved to reduce visitor pressure rather than increase it were ignored, and their demands and those of environmental NGO's were only partially satisfied. This

resulted in a slight reduction of allowed visits in the final version of the plan in comparison to earlier drafts, the creation of a no-go zone in the Medallot islet to be used as a reference sample point and the constitution of a scientific advisory committee, a measure that was provided for in the law creating the Natural Park in 2010 but had never been developed. These events cast doubt on the scientific community's influence over conservation management in the regional context (Few 2000, Adams et al. 2007) and support the Foucaultian notion that “ideas are not powerful because they are true, [...] they are true because of power” (Robbins 2012: 124).

Tolerated Offences and Tolerable Sanctions

It is often acknowledged in the scientific literature that conservation policies in developing countries can be negatively impacted by institutional corruption and a systemic lack of structures and resources to patrol natural protected areas and clamp down on illegal practices such as poaching or illegal trespassing (Smith et al. 2003; Robbins 2012; Haddock-Fraser and Hampton 2012). Our case study provides evidence to suggest that developed countries appear to suffer from similar problems which, in turn, affect how conservation strategies are designed.

Evidence abounds of illegal activities taking place in the Medes Islands MPA, with fines repeatedly imposed on scuba diving businesses that serve customers without a licence, sporadic fines handed out to fishermen who have the know-how to trespass the boundaries of the reserve and the occasional seizure of coral and lobster catches suspected to have been poached from the MPA. One case of corruption involved a member of the sector police leaking the scheduled calendar when agents would be conducting inspections of scuba diving businesses in the area. Most worryingly, members of the Natural Park management team received threats of violence from unidentified sources shortly before approval of the new regulation, even though the research could not determine whether this episode was related to the MPA plan or other restrictive practices.

The discourses from the different consulted stakeholders reflected very different perspectives and sensibilities on this issue. Environmental NGO's, park rangers and the scientific community considered illegal activities to be common practice in the MPA and demanded tighter regulation and increased patrolling. The view of representatives from the administration, the natural park management, fishing organizations and the scuba diving sector was that illegal activities had only a marginal effect on the conservation of the reserve. One of the representatives of the diving industry bluntly admitted that receiving an occasional fine was inevitable with the daily-cap regulation, indicating that economic sanctions were not a significant disincentive to illegally exceed visitor quotas. While the approved 2017 decree allocated slightly more resources to patrolling and formally established an inspection plan, the severity of sanctions, which is established by independent legislation, remained the same. Therefore, it is reasonable to think that a somewhat apologetic discourse and tolerance of

ongoing offences and abuses of the CC-based regulation might have played a part in avoiding opposition from certain groups, ultimately contributing to its formal adoption being secured.

CONCLUSIONS

A political ecology approach was adopted to the case study presented in this research paper in order to determine the factors behind the adoption of a CC-based strategy for managing scuba diving tourism pressures in a biodiversity-rich but degraded MPA and its concretion into a visitor cap set at 74,876 annual visitors. The research has revealed an acute dissonance between formal motivations and the stated goal of setting up access restrictions based on monitored environmental conditions and the informal criteria and interests operating in practice.

Procedures for implementing a CC-based natural resource management model in the Medes Islands MPA formally satisfied all legal requirements enforceable in a mature liberal democracy. However, beneath this formal level, a number of factors interacted to prevent the structuralist scientific knowledge sustaining the CC concept from being operationalised in any meaningful form. Conflicting interests among stakeholders and uneven patterns of power distribution were observed behind many of these factors: from the absence of certain voices in the negotiations and disregard for others who prescribed a precautionary approach to the transfer of decision-making responsibilities to a few well-connected individuals at a local scale or an unwillingness to implement a harsher punitive framework. The effectiveness of the consensual CC-based strategy was severely undermined by the deliberate ignorance of pre-existing power structures surrounding the management of the MPA and a poor understanding of the mechanisms in which they operated. Instead of veiling power behind the aseptic discourse of post-positivistic objectiveness, to be effective and minimise social conflict natural resource management policies and other governance arrangements that have the potential to affect communities and the common good should include an assessment of biopolitical factors.

Over the years, the CC concept has successfully expanded from enjoying a relatively limited use in farming and biological studies to constituting the basis of several strategies for the sustainable management of natural resources, sites and human activities, including tourism. In parallel with this expansion, a growing body of scientific literature has revealed flaws in the theoretical construct and its weaknesses as a tool for management and regulation. As described in the introductory section, much of this critical literature has highlighted the theoretical limitations of the concept, discredited the assumptions of ecological stability and constant human behaviour on which it relies, and demonstrated the methodological constraints that hamper a true measurement of CC. Nevertheless, many of these contributions often propose measures to overcome these shortcomings and suggest improvements, ultimately vindicating the concept (see, for instance, Davis and Tisdell 1995; Butler 1996; Bentz et al. 2016; Coccossis and Mexa 2017). Alongside this reformist

stance, political ecology studies have also warned of the intrinsic limitations of the construct and its use, particularly in natural protected areas of the Global South, where conservation programmes are often advanced or overseen by international groups and institutions and promoted with the promise of scientific objectiveness. The negative and unequitable results of these schemes have prompted many political ecologists to consider this post-positivistic model as dated and unsuitable, demanding its replacement with conservation strategies that are sensitive to local communities' development needs and preferences (see, for instance, Adger et al. 2001; Adams and Hutton 2007; Turner and Robbins 2008; Gray 2010).

While a significant part of the scientific community calls for an in-depth re-consideration of the CC concept and how it is used in practice, the research has shown, how, even in an advanced democracy like Spain, CC is presented as an effective and innovative approach to support MPA management and access regulation. The results indicate that, in the Global North, decision-making is heavily influenced by the same dynamics that have been repeatedly found to operate in countries with underdeveloped institutions and very limited means to support policy development, thus leading to similar failures. More research is needed to understand why, despite all of its widely reported weaknesses, CC is still commonly used as a tool in protected areas worldwide. The Medes Islands case study suggests that, paradoxically, its attractiveness might derive from a combination of two elements. First, regardless of previous successes and failures reported in the literature, the CC construct is perceived as a scientifically sound approach, gaining the support of stakeholders ranging from biological scientists to natural park rangers and NGOs. Second, the very liquidity of the concept and uncertainty over its operationalisation make it vulnerable to being emptied of meaning and, ultimately, detached from scientific rigour, a discourse that serves the interests of the most powerful and well-connected stakeholders. In the Medes Islands context, this included the public administration, the natural park management and scuba diving businesses, who all viewed the new regime favourably, at least while it remained only an idea on paper.

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