

Multiple Use Marine Protected Areas as Complex Commons

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Abstract:

Since the 1970s conservation generally has become more participatory, particularly with regards to local communities. The new paradigm of inclusivity in protected areas calls for the devolution of power, the embracement of uncertainty, and the legitimization of local knowledge and values, many of the principles of successful commons management. Increasingly there is an 'essential affinity' between 'the commons' and 'protected areas'. This is particularly so in those 'new' IUCN categories V and VI which have introduced the concept of multiple-use as an integral part of their management. In the 2003 UN list of protected areas, these categories accounted for nearly 30% of the total protected area worldwide. The increasing popularity of IUCN category V and VI protected areas is magnified in the designation of Marine Protected Areas (MPAs). These categories account for over half of the total protected marine area. In addition, closer analysis of examples of the 'other' MPA categories reveals that many of these areas are zoned, hence one could in argue that most MPAs show some form of multiple use regardless of the IUCN category designated. As recreational time increases, the marine and coastal region becomes more important as the world's greatest tourist attraction. Traditional users, such as artisanal fishermen, are being pushed towards the periphery of management of these regions. The designation of an MPA can be used to reinstall common property rights to traditional users for sustainable management of these regions. Creating management to develop these resources sustainably is becoming critical. This paper provides an example of the use of the common pool theory lens for the investigation of MPA development in a case study in Croatia. We conclude that the use of commons research can provide insights into the development of MPA institutions for the future management of coastal and marine resources.

Introduction

The conservation paradigm has changed substantially since the 1970s. Protected areas were originally developed with an exclusionary approach to designation and management, following an almost autocratic elitist style (Western & Wright, 1994). In many cases the protected area agencies of the early twentieth century undermined traditional rights and access systems already in place (Graham *et al.*, 2003; Philips, 2003). Up to and beyond the 1960s, protected area policy favoured the top-down approach with little concern for the welfare of the local population. Since the 1970s, however, conservation has become more participatory, particularly with regards to local communities within, and adjacent to, protected areas. Conservation has become participatory for two main reasons: first, the general rise in civil society around the world, and second, complex environmental problems require access to various knowledges, not only scientific (Berkes, 2004; Western & Wright, 1994). Increasing recognition that the failure to integrate local socio-cultural issues within park management was undermining management objectives necessitated a change in the governance paradigm of protected areas (Lane, 1997). At the 1992 World Park Congress a new series of protected area categories, including categories V and VI that allow resource extraction, were devised (Locke & Dearden, 2005). Until

recently these ‘new’ categories received less attention than the traditional categories I to IV (Phillips, 2002). Whilst these designations remain concentrated on the conservation of biodiversity, they provide for sustainable use as an integral part of their management. In the 2003 UN list of protected areas, these categories accounted for nearly 30% of the total protected area worldwide¹ (Chape *et al.*, 2003). The latest World Parks Congress², held in 2003, signalled an even more abrupt shift towards inclusive management of protected areas. Entitled, ‘Benefits beyond Boundaries’ the Congress promoted the development of ‘*more people orientated management*’ (Phillips, 2003: 21). The resulting protected area policy is strikingly opposed to the original concept of a protected area, adopted until only 30 years ago (see table 1).

Table 1: Paradigm Changes in Protected Area Management		
	Pre 1970’s	Post 2000
Objectives	Set aside for conservation	Run also with social & economic objectives
	Established mainly for spectacular wildlife & scenic protection	Often set up for scientific, economic & cultural reasons
	Managed mainly for visitors & tourists	Managed with local people more in mind
	Valued as wilderness	Valued for cultural importance of so-called wilderness
	About protection	Also about restoration & rehabilitation
Governance	Run by central government	Run by many partners
Local people	Planned & managed against local people	Run with, for & in some cases by local people
	Managed without regard to local opinions	Managed to meet the needs of local people
Wider context	Developed separately	Planned as part of national, regional & international systems
	Managed as ‘islands’	Developed as ‘networks’
Perceptions	Viewed primarily as a national asset	Viewed also as a community asset
	Viewed only as a national concern	Viewed also as an international concern
Management techniques	Managed reactively within a short timescale	Managed adaptively in long-term perspective
	Managed in a technocratic way	Managed with political considerations
Finance	Paid by tax-payer	Paid for by many sources
Management skills	Managed by scientists & natural resource experts	Managed by multi-skilled individuals

¹ Another 19% remains un-categorised by the IUCN.

² The IUCN World Parks Congress is held every ten years and is seen as a major indicator of the direction for protected area management for the following decade.

	Expert led	Drawing on local knowledge
After Phillips (2003)		

The inclusionary aspect of the management of these forms of protected areas resonates with issues of developing collective action for the successful management of the commons. Many of the changes to protected area designation and management, seen in table 1, echo the principles of successful CPR management, such as the devolution of power, embracing uncertainty, and legitimising local knowledge and values. It is clear that the integration of socio-economic aspects into protected area management requires changes to the methods that we use to assess management design and efficiency. Murphree (2002: 3) suggests that there is an ‘essential affinity’ between ‘the commons’ and ‘protected areas’:

‘the commons are protected areas in that they are sites and bundles of collective entitlement for their constituents which require protection through controls on their use. Their legitimisations may come from a variety of sources, the entitlements may be differential and the definition of their constituencies may vary, but their essence is collective and controlled access’.

The two defining characteristics of a CPR are subtractability and excludability (Ostrom, 1990). Rules must be designed to not only manage the resource system and the resource units, but also the users³. Much of the original work conducted on the analysis of management regimes for CPRs has focused on resource systems that are subject to one single, extractive resource use (Agrawal, 2002; Ostrom, 1990; Pinkerton, 1989; Wade, 1988). In the case of the marine environment this has been inshore fisheries (Acheson, 1997; Baland & Platteau, 1999; Berkes, 1986; Dietz et al., 2002; Gordon, 1954; Jentoft et al., 1998; Ostrom, 1990; Pinkerton, 1989; Seabright, 1993; Wilson, 2002). Yet, more often than not, a resource system may provide more than one form of resource unit, or a resource unit that may be utilised by various appropriators in different ways (Edwards & Steins, 1998). New user groups, such as tourism, derive benefits from the resource system itself, rather than from units produced from the system. These ‘new’ user groups are often driven by conservationists and recreational users, and the provision of non-consumptive uses (Buck, 1999). Despite the association of tourism as a ‘non-extractive use’ there are increasing concerns over the extractive element of tourism and the subsequent loss of environmental amenity values (Briassoulis, 2002; Butler, 1991; Ostrom et al., 1999). Although, a single user may have little effect on the resource, cumulative use may significantly degrade it. In multiple-use commons this aspect is exacerbated, particularly considering that some user groups will conflict and may not communicate with other user groups. As external markets continue to integrate with new areas of the world, traditional commons will increasingly come into conflict with new appropriators that have varying legitimacies to resource systems and units (Edwards & Steins, 1998; Stern et al., 2002). Designing and maintaining institutions for multiple-use sites may become a significant issue, not only physically, but also politically. When commons evolve into multiple-use the institutional framework needs

³ It is important to distinguish between the ‘resource system’, and the ‘resource units’ that may be obtained from the system, recognising that the latter is dependent on the former. Examples of natural resource systems include forests, ground water supplies, grazing areas, and oceans. Consequently, resource units are what individuals traditionally use from the system, such as lumber, irrigation water, animal fodder, and fish, respectively.

to be re-negotiated. This is to avoid adverse impacts associated with increased access of new users to the resource system, overexploitation, alienation of traditional users, and inter-user conflicts (Edwards & Steins, 1998; Selsky & Creahan, 1996).

Design Principles

Comparative studies analysing examples of successful CPR management have resulted in various 'design principles' being drawn up (Ostrom, 1990, Pinkerton, 1989; Platteau & Baland, 1996; Wade, 1988). Ostrom (1990) focuses on the design principles to create, adapt, and sustain institutions to manage CPRs, and there are some distinct similarities in the results from other authors, such as Pinkerton (1989), Platteau & Baland (1996), and Wade (1988). Four key areas are highlighted:

1. Resource characteristics;
2. Group characteristics;
3. Institutional arrangements; and,
4. External factors.

Analysis of the previous authors' work has resulted in a set of enabling conditions for facilitating and sustaining commons institutions being drawn up (Agrawal, 2002). Although, these conditions incorporate many findings from empirical work concentrating on these 'design principles' alone may undermine the results of institution building. Instead of focusing on a broad list of factors that apply to all commons institutions, it may be more beneficial to focus on configurations of conditions that are only relevant to the study undertaken, but may not be applicable elsewhere, due to problems with method, analysis, and context (Agrawal, 2002). In the case of biodiversity conservation Naughton-Treves & Sanderson (1995) propose that no existing form of property right could be adequate for all contexts, rather property arrangements depend on social and ecological context within which they are embedded. Nevertheless, these design principles do provide a viable starting point for the analysis of the sustainability of institutions for CPR management.

Table 2: Critical Enabling Conditions for Sustainability on the Commons	
(1)	Resource system characteristics <ol style="list-style-type: none"> (i) Small size (RW) (ii) Well defined boundaries (RW, EO) (iii) Low levels of mobility (iv) Possibilities of storage of benefits from the resource (v) Predictability
(2)	Group characteristics <ol style="list-style-type: none"> (i) Small size (RW, B&P) (ii) Clearly defined boundaries (RW, EO) (iii) Shared norms (B&P) (iv) Past successful experience – social capital (RW, B&P) (v) Appropriate leadership – young, familiar with changing external environments, connected to local traditional elite (B&P)

- (vi) Interdependence among group members (RW, B&P)
- (vii) Heterogeneity of endowments, homogeneity of identities and interests (B&P)
- (viii) Low levels of poverty

(1) & (2) *Relationship between resource system characteristics and group characteristics*

- (i) Overlap between user group residential location and resource location (RW, B&P)
- (ii) High levels of dependence by group members on resource system (RW)
- (iii) Fairness in allocation of benefits from common resources (B&P)
- (iv) Low levels of user demand
- (v) Gradual change in levels of demand

(3) Institutional arrangements

- (i) Rules are simple and easy to understand (B&P)
- (ii) Locally devised access and management rules (RW, EO, B&P)
- (iii) Ease of enforcement of rules (RW, EO, B&P)
- (iv) Graduated sanctions (RW, EO)
- (v) Availability of low cost adjudication (EO)
- (vi) Accountability of monitors and other officials to users

(1) & (3) *Relationship between resource system and institutional arrangements*

- (i) Match restrictions on harvests to regeneration of resources (RW, EO)

(4) External environment

- (i) Technology
 - (a) Low-cost exclusion technology (RW)
 - (b) Time for adaptation to new technologies related to the commons
- (ii) Low levels of articulation with external markets
- (iii) Gradual change in articulation with external markets
- (iv) State
 - (a) Central governments should not undermine local authority (RW, EO)
 - (b) Supportive external sanctioning institutions (B&P)
 - (c) Appropriate levels of external aid to compensate local users for conservation activities (B&P)
 - (d) Nested levels of appropriation, provision, enforcement, governance (EO)

From Agrawal (2002: 62-63)

SOURCES: RW, Wade (1988); EO, Ostrom (1990); B&P, Baland & Platteau (1996).

The Marine Protected Area Context.

Historically, the primary use of the sea has been for fisheries, hence the development of CPR scholarship into community based fisheries management. However, the marine and coastal area provides many different resource units, both extractive and non extractive, to multiple-users. Utilisation of marine resources in the coastal area has changed from traditional extractive use towards recreational and tourism use of the resource system. Invariably, the economic importance of new users has led to traditional stakeholders becoming peripheralised, and areas deteriorating environmentally whilst developing economically (Christie *et al.*, 2003; Garaway & Esteban, 2003).

There are three principle approaches to marine conservation. The first, and oldest, is designed to regulate and manage individual activities, often fisheries, by specialist state agencies (Mulongoy & Chape, 2004). The second involves the establishment of small highly protected areas for particularly vulnerable habitats⁴. The third consists of the creation of large, multiple-use protected areas with an integrated system of management for varying levels of protection (Kelleher & Kenchington, 1991). Increasingly the final approach is being used to assert some form of management over the coastal and marine zone. Its popularity is reflected in the amount of MPAs being under the IUCN categories V and VI (table 3). Categories V and VI account for over half of the total protected marine area⁵, compared to 30% for the total protected area worldwide (Chape *et al.*, 2003; Mulongoy & Chape, 2004). The integrated multiple-use method has the advantage that:

‘co-ordination of regulation of different human activities can be automatically achieved when the overriding responsibility for management rests with one agency. Coordination of management in the marine environment is in many ways even more important than it is in the terrestrial sphere. This is because the high degree of connectivity in the seas facilitates the transmission of substances and effects throughout the water column’ (Kelleher & Kenchington, 1991: 1).

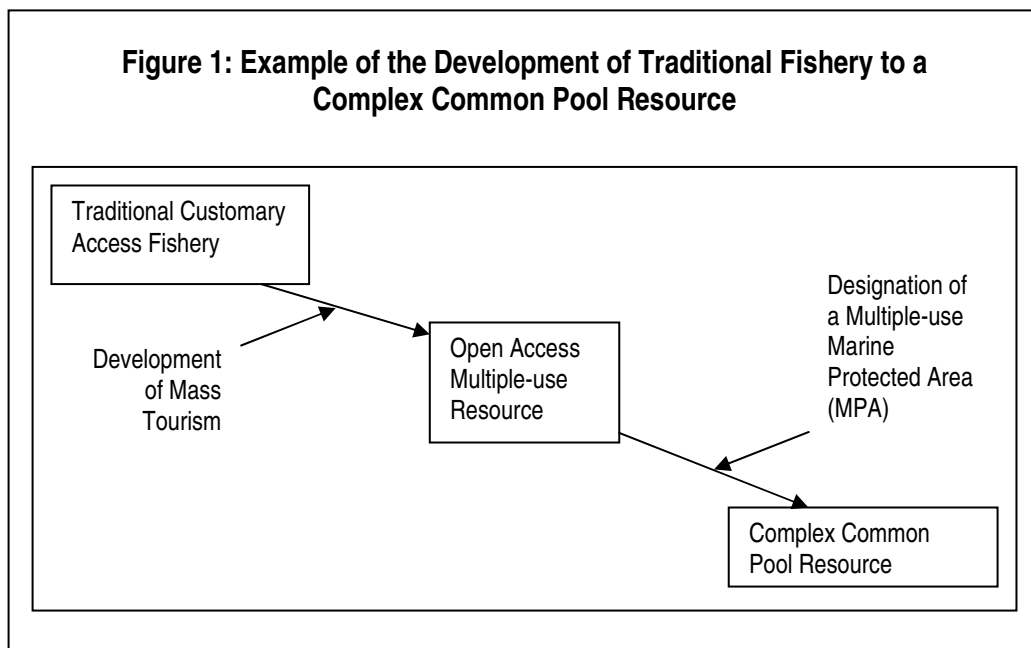
IUCN Category	Number of Sites	Total Marine Area (km²)	Proportion of global ocean area (%)
I-VI		1 577 883	0.44
Ia	419	189 439	0.05
Ib	49	5 916	0.00
II	666	279 654	0.08
III	133	3 819	0.00
IV	1 494	305 329	0.08
V	571	73 279	0.02
VI	159	809 354	0.22

⁴ No Take Zones or No Take Marine Protected Areas usually restrict ‘extractive’ use of an area, invariably for fisheries.

⁵ 53.8% of marine protected areas are categorised as V and VI, another 4% remains un-categorised by the IUCN.

No category	625	66 400	0.02
	4 116	1 639 065	0.45
The numbers have been corrected to avoid the problem of double counting where designations overlap, hence the sum of the individual categories gives a slightly higher total than the actual total figures provided here (After Mulongoy & Chape, 2004: 29)			

The nature of multiple-use, IUCN categories V and VI MPAs make them ideal to be analysed as complex CPRs. There is a mix of extractive and non-extractive use, a mix of users, and the definition of boundaries leading to the possibility of exclusion. It is also difficult to separate resource use and conservation in the marine system, as natural resources and their living space are sought after by many different users, for many different purposes (Kelleher & Recchia, 1998). This is particularly pertinent when considering the physical and historical attributes of the marine environment, where material boundaries are difficult to maintain, and rights of innocent passage are guaranteed under customary international law (Kelleher & Kenchington, 1991). Based on the current paradigm of inclusive protected area management, the action of designating a multiple-use MPA converts an open access resource system into a CPR, providing there were no prior informal rules governing the area (figure 1).



Community involvement in multiple use MPAs is not only important to avoid conflict, but also for the development of rounded knowledge in this cryptic and alien environment. Bio-geographical complexity makes the marine system inherently uncertain. Uncertainty can undermine the biological justification, the identification of cause and effect relationships, and even, the verification of the effectiveness of an MPA (Ralls & Taylor, 2000). However, more often than not, once an MPA has been proposed the underlying biological objective has already been defined. Invariably, social science is left trailing behind, and then spends vital time 'catching up' with biological science. The application of a balanced inter-disciplinary framework reminds researchers that it is important to consider aspects other than biology earlier in the process to facilitate MPA management, and make it sustainable over the long-term. It may also be useful to focus research attention on aspects of MPAs that are

of significant importance to stakeholders, yet seeming insignificant to biologists. The 'critical enabling conditions' may be particularly insightful for the examination of, group characteristics and institutional arrangements, but less informative for resource characteristics and external factors, that have been widely investigated by MPA policy makers. Balancing conservation and sustainable use is a continuing problem, especially in multiple-use MPAs. Yet, despite the dominance of category V and VI within MPA designation a closer investigation of many of the 'stricter' MPAs reveals that many utilise some form of formal zoning or indeed multiple use continues regardless of the institutional arrangements. In fact rarely would a category Ia marine area be termed as such if transplanted into the terrestrial environment. A brief analysis of the situation in Croatia outlines this issue.

The Croatian Situation

As a whole protected area management in Croatia lacks a coherent strategy. In fact many protected areas were designated in the Yugoslav period with little or no regard to factors of biodiversity. In general protected areas in Croatia suffer from the same issues as protected areas worldwide: inadequate financing; lack of benefits to local communities; inconsistent enforcement of law and regulations; low environmental awareness and education on all levels; and, a lack of professional capacity and knowledge. In fact, protected areas generally are designated on an *ad hoc* basis with little consultation or participation of local communities in the identification, designation and development of management.

Over one third of the Croatian national territory is marine⁶. The terrestrial area under some form of protection within Croatia amounts to 9.4% of the total landmass (State Institute for Nature Protection, 2008). In total less than 3% of the marine system in Croatia is under protection⁷. Table 4 illustrates the current situation with regard to the development of protected areas with a marine component.

Limski and Malostonski bays have been designated as strict nature reserves officially managed mainly for scientific reasons. However, both these sites were designated for the continued mariculture of molluscs, yet recreational use of the bays continues. Brijuni, Kornati and Mljet are categorised as national parks, managed mainly for ecosystem protection and recreation, their original designation was based on aesthetics rather than biodiversity reasoning. There are continuing problems with illegal construction on the islands and illegal fishing by visitors and local people. Finally the two most recent additions to Croatian marine conservation areas are Lastovo Park of Nature and Lošinj Special Marine Reserve. Between them they constitute 68.3% of the area protected for marine biodiversity in Croatia. They have been designated on biological grounds, but with the concept of multiple-use as part of their rationale.

Table 4: Protected Areas with a Marine Component in Croatia

Name	Established	Management Plan	Designation Type	IUCN Category	Total Area (ha)	Marine Area (ha)
Limski Bay	1979	-	Special Marine Reserve	Ia		600
Malostonski Bay	1983	-	Special Marine Reserve	Ia		4,821
Brijuni	1983	-	National Park	II	3,635	2,651
Kornati	1980	2003	National Park	II	22,375	17,307

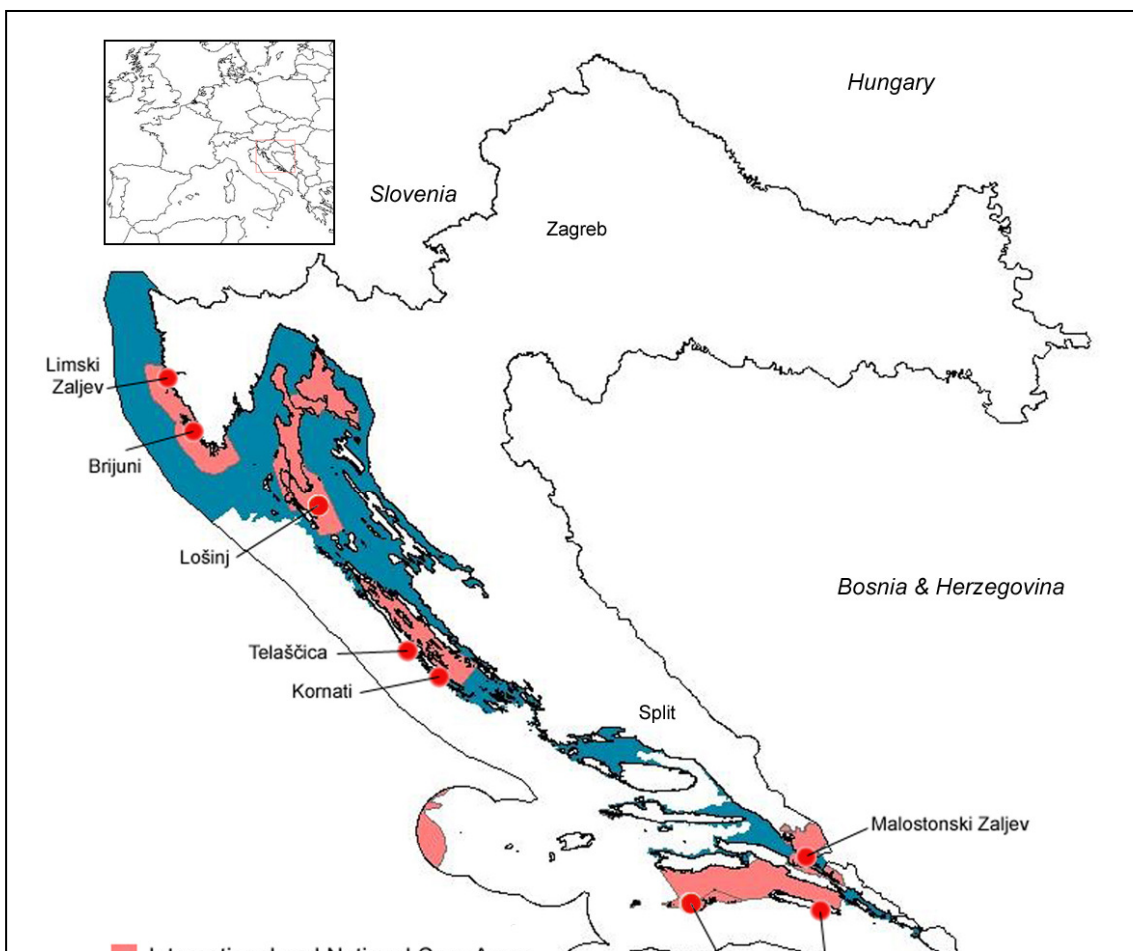
⁶ Terrestrial territorial area 56,542 km², Territorial sea: 33,200 km²

⁷ Although the development of the IUCN category system was explicitly designed to cover all environments, less than 1% of the oceans are under protected status, compared to 12% of the land (Kelleher et al., 1995).

Mljet	1960	2001	National Park	II	4,619	1,519
Telašćica Bay	1988	1990	Nature Park	V	6,706	3,972
Lastovo	2005	-	Nature Park	V	19,583	14,312
Lošinj	2006	-	Special Marine Reserve	-	52,576	52,335

There is little knowledge or understanding for the development of marine nature protection, outside fisheries, in Croatia. The absence of a framework for the development of MPAs underlines this. Croatian designation of protected areas with marine constituents is typical. Prior to the 1990s the protected areas were designated with little or no consultation with local communities, and designed to be restrictive. However, traditional use, lack of institutional capacity and will, and general disregard for the regulations in place has made these protected areas little more than paper parks (Frankic, 2004). Although all of the sites have IUCN categories there remains some form of resource use, particularly with regards to tourism.

The development of Lastov and Lošinj has followed a different course; both areas have been proposed post 1990, which is significant for two reasons. The first follows the previous discussion with regard to the evolution of the protected area policy. The second is related to the development of the Croatian State post Yugoslavia. Early in the development of the protected areas there has been local discourse and a general desire to catalyse local support for the designations. Specifically, this paper concentrates on the development of the 'Lošinj Special Marine Reserve'.



The Lošinj Special Marine Reserve

Introduction

Lošinj Island is located in the northernmost archipelago in the Adriatic Sea within the borderland area of the Northern Adriatic, where the three great European racial groups, the Mediterranean, Germanic, and Slav, meet (Ballinger, 2004; Moodie, 1950). It is historically and geographically an extension of the Istrian peninsula, now part of the Republic of Croatia. The island has consistently ended up in the hands of the dominant power in the Adriatic, the Venetians, Austro-Hungarians, French and the Yugoslavs. Lošinj remains in the borderland region of Croatia, influenced not only by the proximity of the border itself, but also by the distance from State institutions, and the fact that it is an island. The marine environment in the region is one of the 'healthiest' left in the degraded Northern Adriatic Sea. The area encompasses a wide range of marine habitats, including rocky shores and bottoms, submerged reefs, seagrass flats, and mud seabed (IDC, 1997). It remains particularly diverse, despite being heavily exploited since the seventeenth century. Over 95 species of teleost fish have been recorded in the area, along with such top predators such as cetaceans and sharks (Sokolić, 1992). The Lošinj Special Marine Reserve represents the largest single marine area to be placed under protection in Croatia⁸. The rationale for its protection is the presence of a population of bottlenose dolphins (*Tursiops truncatus*) a priority species under national and international law⁹. Due to the significant importance of this area for tourism and local fishery, it is proposed as multiple-use area under IUCN guidelines. The dolphins are being used as a 'flagship species' to enable the creation of an institution to assert some local control over the resource system which is essentially 'open access'. The dolphins are not only the 'flagship species' for the Reserve, but also for the development of the island; Lošinj is now marketed as 'the island of dolphins'. The image of the dolphin is inherently linked to the image of the whole island, and as such the Reserve will provide an important tangible link between the natural and economic capital of the island.

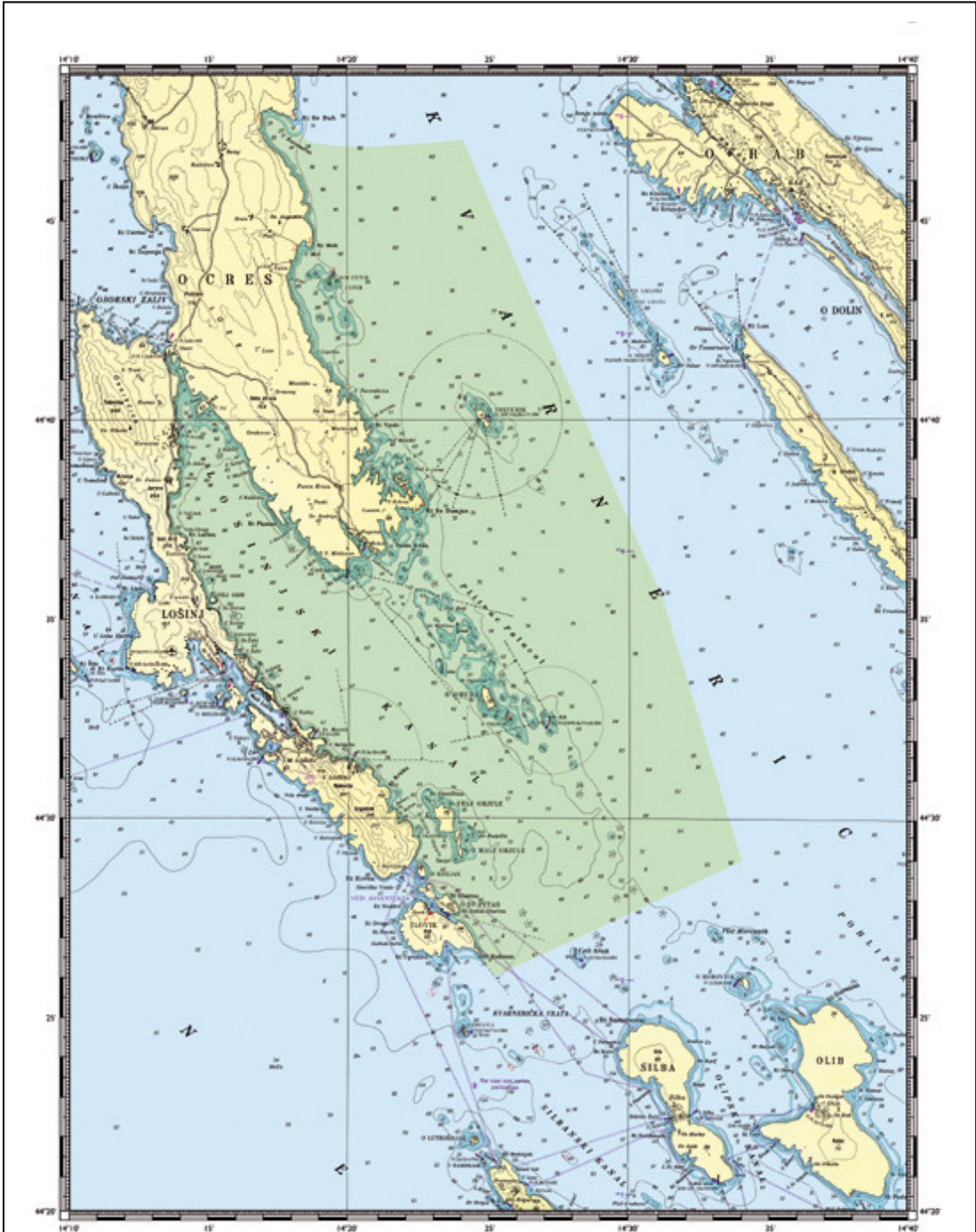
Applying Critical Enabling Conditions

The authors have been involved with the development of the Lošinj MPA at an early stage (Mackelworth et al., 2001; Mackelworth et al., 2003). As the process of the designation developed it became clear that the absence of State institutional capacity and will to engage with the local community would undermine the potential development of the Reserve. In response we sought a combination of Kelleher's (1999) 'whole-view' interdisciplinary project planning with an academically defensible framework. The original four key areas identified by Ostrom (1990), Pinkerton (1989), Baland & Platteau (1996), and Wade (1988) of resource

⁸ The full title of the Reserve, under Croatian law is: A Special Nature Reserve in the Sea for the Protection of the Common Bottlenose Dolphins (*Tursiops truncatus*) of the Cres-Lošinj Archipelago. The definition 'Reserve' comes from the Croatian designation type rather than the proposed management technique. The Lošinj Dolphin Reserve is proposed as a managed multiple-use area rather than a no-take reserve, as implied by its title.

⁹ Bottlenose dolphins are protected under Croatian law, and are listed under Annex II of the European Union habitats directive. They are also protected under the Convention of Migratory Species which is enacted in the Mediterranean through the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS).

characteristics, group characteristics, institutional arrangements, and external factors, provide the basis for just such an interdisciplinary approach. In effect we loosely took Agrawal's (2002) critical enabling conditions and tested them in the development of a multiple-use marine protected area context using them as a generic framework. However, data analysis clearly showed there was an overlap between certain aspects of the case study, particularly the external factors. The case study was so embedded into these contextual factors that it was difficult to determine what was internal and external. This may explain why 'external contextual factors' are suggested as being ignored by other authors, when in fact, they are internalised within the work (Agrawal, 2002; Edwards & Steins, 1999). Ultimately we broke with the four key areas to concentrate on the resource characteristics, group characteristics, and institutional arrangements, embedding them within the context of the case study.



0 10 20km

Resource Characteristics

The main features highlighted with regard to the resource characteristics, according to Agrawal's (2002) framework, were the necessity for clearly delineated boundaries to the Reserve and the reduction of scientific uncertainty. The need for a clear jurisdictional boundary, in anticipation for coordination with monitoring organisations, was deemed important with regards to enforcement of user rights. The absence of clear boundaries will not only affect the ability of monitors to exclude unauthorised users, but increases the possibility of movement of resource units through the system and appropriation by outside users. This reflects the findings of Kelleher & Kenchington (1991) who identify boundary definition as the first step towards the establishment and management of an MPA.

The movement of the dolphins in and through the Reserve was seen as a potential undermining aspect of the scientific rationale. The nature of the marine environment and cetaceans in particular make the provision of certain science difficult. Hence the adoption of precaution in the face of uncertainty is perhaps more imperative in this environment than others. The pragmatic inclusion of scientific information regarding other species, such as the presence of marine turtles, sea-bird species, and archaeological data helped develop a broad coalition of institutions and advocates for the development of the Reserve. It was also important to translate scientific information into 'lay-mans' terms. The provision of a basic summary of the science, methodology and designation objectives provided a discussion document that provided a starting point for negotiations, presenting the scientific argument for the development of the Reserve in a manner that could be understood by all stakeholders. In addition what came to light was the importance of the origin of the scientific information. The fact that the Reserve was developed and suggested by a local NGO created a greater feeling of ownership of the scientific information, but in contrast local familiarity with the researchers undermined the perception of professionalism.

Group Characteristics

Three issues emerge strongly at island level: heterogeneity, generalised trust and social capital, and the role of appropriate leadership. Despite their isolation from the mainland the construction of the local community has been significantly influenced by the character and history of the State, the Adriatic region, as well as the local environs. Related to the changes in the nation-state, has been large scale migrations making the island demographically unrecognisable compared to the turn of the century. Despite being ethnically homogenous, the fractured nature of the island society undermines the construction of 'bonding' social capital between 'islanders'. The population is not split on ethnic grounds, as one might expect considering Croatia's recent history, but on social or cultural grounds based on ancestry or origin. The situation echoes the findings of Bennett (1995), who suggests that the great divide in Yugoslav society was between rural and urban communities, not peoples. Political changes in the region as a whole led to widespread migration, particularly from these borderlands. Following the Second World War, large emigrations of the Italian minority and non-communists led the island into decline, with population levels falling to 70% of that in the 1850s. Only with the development of mass tourism facilities in the late 1960s did the population begin to rise again on the islands

(Podgorelec, 1999). Many of the positions left by the Italian émigrés were filled by the immigration of other Yugoslavs, predominantly from the interior of the country. Immigration of these continental Yugoslav peoples significantly changed the demographic balance of the island. Immigrants brought with them issues of personal identity related to their origin exacerbating ethnic or social heterogeneity, resulting in a socially stratified community.

Looking more specifically at the Reserve, the civil society groups involved in negotiations are split and there is little bridging between the entrenched groups, particularly tourism and fishery. These two heterogenic interests are further fuelled by significant disparities in wealth and power. Tourism dominates the economy and the politics of the island leaving the fishery peripheralised. These two stakeholder groups remain fractured, with fragile leadership and motivated by selfish goals. However, support from appropriate leaders from other groups, as well as the relevant authorities, and civil society, has been crucial.

Finally, although the island is wealthy in Croatian terms, it is relatively poor compared to the surrounding EU states of Italy, Austria, Germany, and even Slovenia. Experience with the breakdown of the local economy in the war and post-war period of the 1990s has left the islanders apprehensive as to what EU integration will bring. There are significant worries that foreign investment will erode the local community, as has been seen in other Mediterranean coastal regions, and the fishery will be overwhelmed by foreign fleets. Associated with this is migration of younger islanders to the mainland and beyond due to exorbitant accommodation prices and the lack of local opportunities. This leads to a reduced capacity for long-term sustainable planning by the local community.

Institutional Aspects

The main features that are drawn out from the case study is the absence of inexperience with the concept of participation for environmental co-management, decline in institutional trust, and the need for equity in the process for all appropriators, from rule definition to sanctioning. The structure and characteristics of the State can play a major role in facilitating or obstructing the development of civil society, and thus the sustainable management of environmental resources. Historically, command and control regimes, like the former Yugoslavia, have made the concept of participation in the development of a conservation project alien. Yet, despite this, and the human and economic costs due to the war, the subsequent post-war corruption and paranoia affected the country more deeply. This is strongly highlighted by the data. The implementation of privatisation policies deprived many Croatian citizens of their rights to share in the distribution of the society's wealth, which they themselves had accumulated during socialism. Other authors concur with this finding suggesting that the increase in corruption in the period 1995-1999 resulted in a decline in generalised trust, civic participation, and trust in institutions generally, all indicators of social capital (Skrbiš, 1999; Spajik-Vrkaš, 2001; Štulhofer, 2004). Conversely, in the late 1990s the third sphere of civil society started to appear, originally in the form of self-help groups supporting war veterans. The largest growth in the registration of civil society organisations occurred between 1998 and 2000. Up to June 2005, there were 26,000 NGOs registered in Croatia (Cooper et al., 2005).

Underlying the development of the Reserve has also been the role of the international institutions, particularly the EU that has galvanised the development of national policies on conservation. In regard to Lošinj, the absence of State capacity has necessitated the development of direct links between Croatian civil society and international institutions which have been fundamental in the development of the underlying science and the negotiations for the Reserve.

Generally using Agrawal's (2002) framework the main issues extracted from the actors appear to be consistent with the development of most co-managed conservation projects. In the development of the rules for the Reserve, the diversity of users requires the definition of simple, enforceable rules. Although the development of enforceable rules is outwardly welcomed by many of the islanders many illegal actions, fishing in particular, are commonplace. Rule breaking is currently the norm due to the ineffectiveness and bias of the enforcement systems currently in place. There is a widespread belief that the only way the system can function appropriately is through some form of co-management, but with supervision from the State. However, there remains fear from certain stakeholder groups, that the Reserve will be appropriated by the economically and politically powerful tourism lobby on the island.

Conclusions

As the marine system becomes more important for all stakeholders, it becomes imperative to test new and existing theories within the field (Berkes, 2004; Mascia, 2004; Murphree, 2002). Although there remain significant differences between MPAs and the classic CPRs, particularly with regard to the fact that invariably, the driving factor behind protected areas is the State or the overarching international structure (Jones & Burgess, 2005), the problems faced are similar and solutions may be sought from interdisciplinary case studies and theory. In both instances the search is for the development of sustainable resource management institutions. The critical enabling conditions can provide a useful framework, based on generic knowledge, from which practitioners can build knowledge of the specific site conditions by using a deep ethnographic approach (McCay, 2002). In the analysis of the empirical work eight factors are highlighted from Agrawal's (2002) framework as being the most important in this case study:

1. The factors of resource system and unit uncertainty;
2. The need for clear boundaries to the resource system;
3. Heterogeneity within primary appropriators, particularly relating to identities and the absence of inter-dependency;
4. Lack of generalised trust and social capital between stakeholder groups and the relevant authorities;
5. The role of appropriate leadership and facilitation;
6. The development of simple rules, and the translation of science into an understandable lay-mans terms;
7. Equity amongst stakeholders with regards to accessing the processes for management.
8. The development of the State and the decline in institutional trust and social capital.

The areas that the framework does not highlight and in turn seem to be lacking for the application of the framework to MPAs, at least in this case study:

1. The role of international regimes, highlighting the potential for funding or sanctioning;
2. The presence of a facilitating non-governmental organisation linking local stakeholders to policy makers;
3. Linking social capital to economic capital and the development of the symbol of the dolphin as that of the island of Lošinj;
4. Crises at local level, particularly with regards to the exploitation of fish stocks, the development of a 'second home' community and the possibilities of alternative employment for younger islanders.

Undoubtedly, biology still provides the underlying theoretical and analytical tools to identify areas of high biological value, but to change human behaviour requires the application of other skills (Christie *et al.*, 2003; Mascia *et al.*, 2003). Invariably, the success of an MPA is based on achieving the primary conservation aim. Yet, using purely biological criteria for the definition of the success of MPAs may be simplifying what is inherently more complex (Christie, 2004; Christie *et al.*, 2003; Jones & Burgess, 2005; Pollnac *et al.*, 2001). Initial biological successes can be undermined

by; the absence of community support, the creation of inappropriate management institutions, the development of new markets, or the absence of a legislative framework, among other factors (Christie et al., 2005; Garaway & Esteban, 2003). As Berkes (2002: 628) states:

'To ground conservation effort we need a more nuanced understanding of the nature of people, communities, institutions and their interrelations at various levels'.

The necessity of understanding the social, economic, cultural, and political dynamics of the communities who interact with, and exploit, marine resources if any effective conservation strategy is to be achieved. As Mascia (2004) points out, MPAs are human constructions developed to control human behaviour and thus are a social phenomenon. Identifying and defining the role of primary appropriators, and subsequently supporting those primary appropriators, who have an intrinsic interest in the resource, is vital to the success of conservation. The CPR framework outlined by Agrawal (2002) provides a basis to investigate the underlying causes affecting the willingness of local people to participate in the development of MPAs. This reminds scientists, be they biologists or social scientists, to seek more participation from local people not only for the sake of international commitments, but for the sake of developing balanced conservation initiatives.

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