UNIVERSIDADE DE LISBOA
FACULDADE DE CIÊNCIAS
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GOVERNANCE FRAMEWORKS FOR MARINE PROTECTED AREAS: PROPOSALS FOR MOZAMBIQUE, TANZANIA AND SOUTH AFRICA

Catarina Bentes Silva Grilo

DOUTORAMENTO EM CIÊNCIAS DO MAR

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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FCT Fundação para a Ciência e a Tecnologia
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RESUMO E PALAVRAS-CHAVE

Resumo: A criação de redes transfronteiriças de Áreas Marinhas Protegidas (AMPs) pode contribuir para que os Estados cumpram os objectivos internacionais de protecção das zonas marinhas sob sua jurisdicção. No entanto, a complexidade deste tipo de iniciativas requer uma análise cuidada dos requisitos governativos da cooperação entre Estados para a conservação dos recursos marinhos partilhados, assim como uma abordagem interdisciplinar em face da natureza do problema. Para guiar este estudo de casos em áreas transfronteiriças na África Austral, foi desenvolvido um enquadramento teórico baseado na governança ambiental, entendida aqui como resultando da combinação da teoria dos bens comuns e da teoria dos regimes. A teoria dos bens comuns forneceu o enquadramento analítico para fazer uma caracterização da situação existente em cada um dos locais de estudo. Esta tese centrou-se em duas áreas de estudo – as fronteiras entre Moçambique e a Tanzânia e entre Moçambique e a África do Sul – e em dois recursos marinhos específicos – recifes de coral e golfinhos-corcunda do Indo-Pacífico (*Sousa chinensis*). A teoria dos regimes suportou a análise do potencial de cooperação entre os países na criação de redes transfronteiriças de AMPs.

A tese é composta por três partes. Da Parte I constam a Introdução (Capítulo 1), o enquadramento teórico (Capítulo 2) e a Metodologia (Capítulo 3), acima resumidas. A Parte II é formada por sete capítulos. Cada um destes capítulos consiste num artigo publicado, em impressão, ou submetido, os quais respondem à questão geral definida no Capítulo 1 e às questões específicas definidas no Capítulo 3. A Parte III consiste num capítulo único, Capítulo 11, onde são apresentadas as conclusões.

No Capítulo 4, procedeu-se à análise das características ecológicas, ameaças e arranjos institucionais relacionados com os recifes de coral e os golfinhos-corcunda em cada uma das áreas de estudo. Os resultados sugerem que as AMPs transfronteiriças não são sempre a ferramenta mais adequada à conservação de recifes de corais e de golfinhos-corcunda do Indo-Pacífico nas áreas transfronteiriças costeiras Moçambique-Tanzânia e Moçambique-África do Sul.

No Capítulo 5, foram comparados os enquadramentos nacionais de governança relacionados com as AMPs nos três países para identificar pontos em comum e diferenças

nos seus procedimentos institucionais, princípios e valores, assim como a medida em que estes afectam a criação e gestão de AMPs transfronteiriças. Conclui-se que, apesar da modernidade dos enquadramentos legais e de *policy* dos três países, subsistem importantes diferenças e insuficiências que os países precisam de ter em conta se decidirem criar AMPs transfronteiriças.

No Capítulo 6, analisou-se em que medida o direito ambiental internacional pode contribuir para a criação e gestão de AMPs transfronteiriças na África Austral. Concluiu-se que, globalmente, a Convenção das Nações Unidas para o Direito do Mar e a Convenção sobre a Diversidade Biológica são os instrumentos-chave para a criação de AMPS e redes de AMPs transfronteiriças. Regionalmente, a Convenção de Nairobi, e especificamente o seu Protocolo sobre Áreas Protegidas, e o Protocolo sobre Vida Selvagem da Comunidade de Desenvolvimento da África Austral, oferecem a base legal para criar e gerir redes transfronteiriças de AMPs. Concluiu-se ainda que é ao nível regional, e mais provavelmente aos níveis bilateral e trilateral, que uma abordagem política e legal será mais efectiva.

No Capítulo 7, estudaram-se as perspectivas de criação de AMPs transfronteiriças recorrendo à teoria dos regimes. Concluiu-se que há um regime plenamente desenvolvido entre Moçambique e a África do Sul, o qual existe independemente do facto de ambos os países já terem proclamado uma AMP transfronteiriça entre eles. Por outras palavras, o "núcleo" do regime – ou seja, os seus princípios e normas – já existiam antes de os dois países terem declarado a AMP transfronteiriça, a qual veio a materializar as regras e procedimentos decisórios que também definem o regime. No caso de Moçambique e Tanzânia, não há um regime entre os dois países para a criação de AMPs transfronteiriças devido a princípios divergentes.

No Capítulo 8, analisaram-se vários casos de conservação transfronteiriça marinha para propor cinco opções diplomáticas e de gestão para a criação de AMPs transfronteiriças entre os três países. As cinco opções apresentadas são: i) AMPs criadas e geridas independentemente nos dois lados da fronteira; ii) AMPs criadas e geridas independentemente, com mecanismos de partilha transfronteiriça de informação; iii) criação e gestão coordenadas de AMPs nos dois lados da fronteira; iv) estabelecimento conjunto de duas AMPs transfronteiriças nos três países; v) acordos diplomáticos e de gestão trilaterais/subregionais. Estas opções podem ser encaradas como um fim em si

mesmas, ou como passos no sentido de um crescente compromisso político entre os três países.

No Capítulo 9, as redes transfronteiriças de AMPs são de novo trazidas para o centro da análise. O seu aparente eclipse nos capítulos precedentes explica-se pela revelação durante o trabalho de campo de que a criação de redes transfronteiriças de AMPs é vista por múltiplos actores como um passo posterior à criação de AMPs transfronteiriças. Este capítulo revisita esta ferramenta ao explorar as interações institucionais em redes de AMPs com AMPs geridas pelas comunidades. Procedeu-se à análise de dez dessas redes de AMPs, o que levou à conclusão de que as interacções institucionais consistem geralmente em trocas de informação e em questões de controle e autoridade. Estas podem ter influência sobre o sucesso das AMPs, mas os seus custos de transacção elevados aconselham a que a sua aplicação seja cuidadosamente avaliada.

Finalmente, no Capítulo 10, explora-se o impacto da (não) delimitação de fronteiras marítimas sobre a cooperação entre Estados na criação de AMPs transfronteiriças. Esta linha de investigação é importante para o caso Moçambique-África do Sul, pois estes dois países ainda não delimitaram a sua fronteira marítima comum. Analisando três AMPs transfronteiriças, concluiu-se que, ao contrário do que é comummente entendido, a criação e gestão de uma AMP transfronteiriça não carece de fronteira marítima delimitada entre os Estados envolvidos, se não houverem questões de relevo relacionadas com a potencial fronteira marítima.

Na Parte III da tese, consistindo no Capítulo 11, é apresentado um resumo das principais conclusões de cada capítulo da Parte II, sempre com referência à subquestão respectiva a que cada capítulo responde. É explicitado o contributo que a adopção de uma abordagem interdisciplinar deu à elaboração da tese e às suas conclusões, nomeadamente pela integração que faz da teoria dos bens comuns e da teoria dos regimes para aplicação ao estudo da conservação marinha transfronteiriça. São ainda referidos os contributos específicos da tese para o conhecimento científico, concretamente: a avaliação da adequação das AMPs transfronteiriças propostas para a conservação de recifes de coral e de golfinhos-corcunda em cada uma das áreas de estudo; a identificação de um regime completamente desenvolvido entre Moçambique e a África do Sul para AMPs transfronteiriças; a ausência de um regime entre Moçambique e a Tanzânia para AMPs transfronteiriças; a definição do contributo que a adopção de uma abordagem sub-regional/trilateral para a criação de AMPs transfronteiriças nos três países pode dar para

se observarem progressos neste domínio; a identificação de uma estratégia de conservação marinha transfronteiriça que comece com a criação de AMPs transfronteiriças como um primeiro passo para a criação de redes transfronteiriças de AMPs. A principal implicação destas descobertas para a *policy* consiste na necessidade de comparar a criação de AMPs com outros instrumentos de gestão marinha, de modo a avaliar adequadamente qual o instrumento que melhor se adequa às condições concretas e objectivas do contexto específico em que se planeia a sua implementação. Finalmente, são propostas novas linhas de investigação que não foram exploradas nesta tese por estarem fora do seu âmbito.

Palavras-chave: áreas marinhas protegidas; conservação transfronteiriça; África Austral; teoria dos bens comuns; teoria dos regimes.

ABSTRACT AND KEYWORDS

Abstract

Transboundary networks of marine protected areas (MPAs) can assist states in meeting MPA coverage targets set internationally. However, their complexity requires a careful examination of the requirements of cooperation between states for the conservation of shared natural resources, as well as an interdisciplinary approach given the nature of the problem. A theoretical framework based on environmental governance was developed to guide this case study in two selected border regions of coastal East Africa. The findings suggest that transboundary MPAs are not always the most appropriate tool for marine conservation of coral reefs and Indo-Pacific humpback dolphins in the Mozambique-Tanzania and Mozambique-South Africa transboundary coastal regions. The three states have modern MPA governance frameworks, but these have important insufficiencies that would need to be addressed in the creation of transboundary MPAs. International environmental law provides an important legal foundation for the creation and management of transboundary MPAs, but a sub-regional approach may be more appropriate for cooperation. A regime exists between Mozambique and South Africa for transboundary MPA-making, but one is lacking between Mozambique and Tanzania, given the former state's interest in hydrocarbon production overriding marine conservation concerns. Nevertheless, five options for cooperation in marine conservation are suggested, depicting an increasing degree of political commitment between the three states. MPA networks may be created to include community-based MPAs, making institutional interplay a potentially critical determinant of MPA success. However, its costs need also to be considered. Finally, it was found that the lack of delimited maritime boundaries between states does not necessarily hinder the creation of a transboundary MPA, particularly if there are no salient boundary issues at stake. States considering engaging in the creation and management of transboundary networks of MPAs with their neighbors are advised to consider the multiple aspects of such endeavors, as well as their implications.

Keywords: marine protected areas; transboundary conservation; East Africa; common pool resource theory; regime theory.

LIST OF PAPERS

This thesis is comprised of the seven papers listed below. Each paper forms an independent chapter, from 4 to 10. The author of this thesis is the first author of four papers (one of which in co-authorship with this thesis' supervisors), and the co-author of three other papers.

- **Grilo, C.** *Submitted*. Transboundary marine protected areas in the Western Indian Ocean: how adequate are they? *Marine Policy*.
- Chircop, A., J. Francis, R. Van Der Elst, H. Pacule, J. Guerreiro, **C. Grilo**, and G. Carneiro. 2010. Governance of Marine Protected Areas in East Africa: A Comparative Study of Mozambique, South Africa, and Tanzania. *Ocean Development & International Law* 41:1 - 33.
- Guerreiro, J., A. Chircop, D. Dzidzornu, **C. Grilo**, R. Ribeiro, R. van der Elst, and A. Viras. 2011. The role of international environmental instruments in enhancing transboundary marine protected areas: An approach in East Africa. *Marine Policy* 35(2):95-104.
- Guerreiro, J., A. Chircop, **C. Grilo**, A. Viras, R. Ribeiro, and R. van der Elst. 2010. Establishing a transboundary network of marine protected areas: Diplomatic and management options for the east African context. *Marine Policy* 34(5):896-910.
- **Grilo, C.**, A. Chircop, and J. Guerreiro. *Submitted*. Prospects for Transboundary Marine Protected Areas in East Africa. *Ocean Development & International Law*.
- **Grilo, C.** *In Press*. Institutional Interplay in Networks of Marine Protected Areas with Community-Based Management. *Coastal Management* 39(4):XX-XX.
- **Grilo, C.** 2010. The Impact of Maritime Boundaries on Cooperation in the Creation of Transboundary Marine Protected Areas: Insights from Three Cases. *Ocean Yearbook* 24:115-150.

ACRONYMS

CBD	Convention on Biological Diversity
CPR	Common Pool Resources
EU	European Union
IUCN	International Union for Conservation of Nature
LME	Large Marine Ecosystem
MBREMP	Mnazi Bay-Ruvuma Estuary Marine Park
MPA	Marine Protected Area
NATO	North Atlantic Treaty Organization
NGO	Non-Governmental Organization
PIC	Prior Informed Consent
PPF	Peace Parks Foundation
QNP	Quirimbas National Park
TBMPA	Transboundary marine protected area
TBNMPA	Transboundary network of marine protected areas
TBPA	Transboundary protected area
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
USA/US	United States of America
WIO	Western Indian Ocean
WPC	World Parks Congress
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWF	World Wildlife Fund

PART I – PAVING THE WAY

1. INTRODUCTION

1.1 Motivation

The world has seen unprecedented changes in the last century. Technological advances and economic development are at the root of closer economic, political, social, cultural and environmental integration and interdependency that characterize our globalized world (Keohane & Nye 2000). Though progressive integration and interdependence are not new phenomena, the spatial and temporal rate at which they take place are unprecedented.

Economically, the lessening of barriers to trade has widened markets and allowed services, goods and capital to reach new places with a new intensity. Economic development, resulting in the emergence of new economies, has reshaped international politics by shifting the balance of power away from traditionally hegemonic nations like the US (Keohane 1984). Political power has not only shifted between states, but also away from them (Stoker 1998). Supranational coordination of trade and financial policies is performed by different technocratic organizations characterized by forms of governance that do not rely heavily on the nation-state. Simultaneously, States are cooperating and fostering organizations at the regional level, and relying on local actors to perform some of their roles. This multiplication of actors and dispersion of authority has taken place not only in relation to states, but also independently of them. Non-governmental organizations (NGOs) are now major players at both the global and national levels, accompanied by global social movements that try to influence decision-making at various levels of authority. Culturally, the integration of societies and the low cost of technologies have widened the range of communication possibilities, facilitating the circulation of knowledge and ideas. Finally, globalization has brought also global environmental change that affects much of the world's population and that has altered the relationships between people and the environment (Young et al. 2006). Climate change is the most paradigmatic example of such global environmental problems.

Globalization has contributed both to changes in how societies are governed and to the expansion of human activities that are associated with an increased degradation of our physical environment. Places left until recently unexplored and unexploited, like the oceans, are now plundered in the quest for more natural resources (Berkes et al. 2006;

Jackson et al. 2001). At the same time, globalization is also at the root of the emergence of new forms of cooperation propelled by the need to resolve old and new environmental problems.

1.1.1 The Rise of Marine Protected Areas

Increased interconnectedness has been paralleled by a recognition and growing awareness of the effects of human actions on the marine environment (Allison et al. 1998; Norse 1993; Ray 1976). The level and extent of human activities impacting the oceans has caused unprecedented changes in their health. The discharge of waste has contaminated coastal and marine waters and food webs, disrupting ecosystems and creating areas void of productivity, i.e., "dead zones" (Diaz & Rosenberg 2008; GESAMP 2001). Fishing, an activity with declining productivity since the mid-1980s, is responsible for the overexploitation of marine resources and physical alteration of the marine environment (Tegner & Dayton 1999; Watson & Pauly 2001). Alien species disturb local food webs and often reduce marine biodiversity (Carlton 1996). Greenhouse gas emissions cause climate change, and are expected to change the geographical distribution of species and habitats, and acidify the oceans (Cicerone et al. 2004; Norse 1993). As a result, marine biodiversity and the provision of vital ecosystem services are threatened (GESAMP 1990; Halpern et al. 2008; Worm et al. 2006).

The deterioration of ocean health has led to a stronger reliance on marine protected areas (MPAs) to protect marine biodiversity and recover degraded ecosystems. MPAs are widely acknowledged as important area-based tools for tackling declining marine biodiversity (Agardy 1997; Belfiore et al. 2004; Kelleher 1999) and ensuring viable fisheries (FAO 2007a; Kelleher 1999). They are portions of the marine environment primarily delimited for marine biodiversity conservation, and often for fisheries enhancement too (Boersma & Parrish 1999). The International Union for the Conservation of Nature (IUCN) defines MPAs as:

> "*Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment*" (IUCN 1988).

MPAs have been relatively successful as tools for marine biodiversity conservation and for fisheries management (Alder 1996; Allison et al. 1998). MPAs provide protection to vulnerable habitats and allow degraded ones to recover (Agardy 2000). They can also protect certain species, if they are designed to address their life history and ecological characteristics (Carr et al. 2003). MPAs usually determine the prohibition of damaging activities, and/or restrictions to levels of less harmful resource-extraction activities. These restrictions make MPAs a safe haven for many species, where they can grow and reproduce, and maintain their genetic diversity. By protecting particularly attractive habitats and the species that depend on them, MPAs can also contribute to tourism, and create alternative sources of income for fishers and coastal collectors affected by restrictions on their activities (Russ & Alcala 1999; White et al. 2002).

MPAs have been reported to support fisheries through the spill-over effect. If a MPA is created, individuals within it are expected to live longer, and have a greater reproductive output; surplus adults and larvae may exit the MPA; and the resulting biomass export could contribute to increased catches and improved recruitment outside its limits (Crowder et al. 2000; Roberts et al. 2001), supporting local fisheries and thus providing “benefits beyond boundaries” (Gell & Roberts 2003; Russ et al. 2004). Where sedentary species are targeted and/or multi-species fisheries are involved, MPAs appear to be particularly effective fisheries management tools when compared with catch limits, particularly in places where there are multiple landing sites (Gell & Roberts 2003; Hilborn et al. 2004; Williams 1998).

MPA fishery effects have been particularly studied in the tropics, more precisely in relation to coral reefs, where relatively sedentary species abound (Christie & White 2007; Francis et al. 2002; Pollnac et al. 2001; Rogers & Beets 2001; Russ & Alcala 1996; White et al. 2002). There is some evidence that the density and biomass of large predatory coral reef fish increased in certain MPAs (Russ & Alcala 1996), and that catches increased by more than 46% in areas adjacent to protected coral reefs (Roberts et al. 2001). However, it is not always clear how adult exports are affected by fishing effort displacement (Halpern et al. 2004).

Despite their widely publicized benefits, MPAs are not without contention and often face serious limitations (Agardy et al. 2011). First, MPAs have often been established opportunistically, without consideration for the ecological characteristics of

the habitats and species they purport to protect (Roberts et al. 2003). Second, there are also MPAs that have been created without sufficient involvement of stakeholders in the planning and management phases (Lundquist & Granek 2005), resulting in great frustration when benefits are observable only in the long term (Andrews 1998; Claudet et al. 2008), and lack of compliance and effectiveness (Suuronen et al. 2010). Third, MPA effectiveness can also be seriously affected if MPAs are not articulated within integrated coastal management (Cicin-Sain & Belfiore 2005) and pollution-control measures (Boersma & Parrish 1999). Forth, MPAs can also cause impacts on their surroundings, particularly when they are created without consideration for local contexts (Ferse et al. 2010). For example, MPAs that impose restrictions on fisheries can displace fishing effort (Mascia & Claus 2009; Mascia et al. 2010), which can become more concentrated in previously unexploited areas. Fifth, there are also MPAs that are not actively managed, creating the impression of protection and suggesting that MPAs are generally ineffective because of the lack of positive effects (Agardy et al. 2011). A final, and often less mentioned, limitation of MPAs concerns their role in fisheries management in temperate waters. The influence of MPAs on fisheries have been mostly studied in tropical environments (Spalding et al. 2008), where most fish species have high site fidelity. In contrast, temperate fishes have low site fidelity, hence the apparent positive effect of MPAs in tropical fisheries cannot be directly transposed to temperate ones (Laurel & Bradbury 2006; Shipp 2003).

1.1.2 Global Support for Marine Protected Areas

Though MPAs are not the only management tool capable of addressing threats to marine biodiversity, and in view of the multiple benefits of MPAs, environmental *fora*[1] and international conventions have strongly supported their creation. MPAs have been advocated as tools to address the declining health of marine and coastal ecosystems since the 1960's: the 1st and 2nd World Conferences on National Parks (Seattle, USA, 1962; Grand Teton National Park, USA, 1972) called for the establishment of marine parks and reserves and the conservation of samples of marine ecosystems (IUCN 1975); in 1975,

[1] Environmental *fora* in this context is understood as intergovernmental and non-governmental conference circuits in which representatives of all the nations, researchers, and environmental organizations gather to address environmental issues that have a significant impact worldwide. Some *fora*, like the World Summit on Sustainable Development, are also attended by special interest groups, such as business organizations.

the IUCN Conference on Marine Parks and Reserves called for the designation of MPAs; in 1988, IUCN's General Assembly approved Recommendation 17.38 urging for a global representative system of MPAs to be created; the 1992 World Parks Congress in Caracas released Recommendation 11 calling for a global network of MPAs. This strong support from the scientific and NGO communities for MPA creation (Agardy 2005) was reinforced by further decisions of similar *fora*, such as the 2003 World Parks Congress (WPC). WPC's Recommendation 22 called for global MPA networks encompassing 20-30% of each habitat (WPC 2003). Recently, the 2008 World Conservation Congress (WCC) approved Resolution 4.045 urging states to strengthen their efforts in MPA establishment (WCC 2008).

More important, though, are the supportive decisions of inter-governmental *fora*, as these are able to influence domestic policies. The 1995 Jakarta Mandate and the 2002 World Summit on Sustainable Development (WSSD) have been widely invoked to support an increase in MPA coverage (Agardy 2005; Belfiore et al. 2004; Boersma & Parrish 1999; Grant 2005). The 1995 Jakarta Mandate (Decision II/10 on the conservation and sustainable use of marine and coastal biological diversity) of the 1992 Convention on Biological Diversity (CBD) encourages parties to use integrated coastal and marine management frameworks as a tool to promote marine and coastal biodiversity. WSSD pledged for the establishment of representative networks of marine protected areas by 2012 (UN 2002).

Various NGOs and scholars have also been quite active in supporting the designation of marine reserves. Marine reserves are a type of MPA, also known as "no-take areas" [2], in which no extractive activities are allowed (Allison et al. 1998). They are promoted as a priority management tool for marine conservation (Roberts & Hawkins 2000) based on the understanding that multiple-use MPAs do not afford as many benefits as marine reserves "because they do not provide the same comprehensive level of protection" (PISCO 2007). A 20-30% marine reserve coverage of the oceans has also been proposed as a means to ensure adequate protection to the marine environment (Bohnsack et al. 2002).

[2] Marine reserves may be found as a stand-alone unit of protection or may be imbedded in the zoning scheme of larger multiple-use MPAs. Marine reserves provide protection against all threats, while MPAs exclude at least one threat (Norse et al. 2003).

The support from inter-governmental and scientific *fora* has put pressure on governments to increase MPA coverage (Gillespie 2007). There are currently 4435 MPAs covering 2.35 million km^2, or 0.65%, of the world's seas (MPANews 2008; Wood 2007). This is quite a timid record, and the marine environment is still lagging behind its terrestrial counterpart, where more than 17 million km^2, more than 11%, are covered by about 70.000 protected areas. Furthermore, if current rates of MPA creation are not improved, the 2012 target will only be met in 2083 (Wood et al. 2008). Even though MPAs are not infallible, expansion of their coverage is thus expected to continue.

1.1.3 Marine Protected Areas and Current Trends in Environmental Governance

Globalization has had profound effects in various dimensions of human societies, including in how they relate to their physical environment. The two most notorious of these effects are the emergence of a multitude of non-state actors, and the relinquishing of state authority to actors at larger and smaller scales.

At the environmental level, and in particular in what concerns protected areas, the forces of globalization have produced particular trends that depict changes in how protected areas are conceived, established and governed (Zimmerer 2006). These trends, while associated generally with terrestrial protected areas, also have their parallels in the marine realm.

First, protected area coverage has grown significantly. Expansion of MPA coverage has occurred by multiplication of existing forms of management, but also through the creation of new types of arrangements to govern protected areas. A paradigm shift from strict nature protection to harmonization of multiple uses aiming at sustainability of conservation is mirrored in the creation of IUCN's protected area categories[3] V and VI in 1992 (Locke & Dearden 2005; Phillips 2003). The emphasis that

[3] IUCN's protected area categories are: Ia – Strict Nature Reserve: protected area managed mainly for science; Ib - Wilderness Area: protected area managed mainly for wilderness protection; II – National Park: protected area managed mainly for ecosystem protection and recreation; III – National Monument: protected area managed mainly for conservation of specific natural features; IV – Habitat/Species Management Area: protected area managed mainly for conservation through management intervention; V – Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation; VI – Managed Resource Protected Area: protected area managed mainly for sustainable use of natural ecosystems (IUCN 1994).

is put on the fisheries benefits of MPAs reflects the recognition of the interdependency between conservation and the activities that might take place within and around MPAs.

Second, the integration of human activities into protected areas planning is taking place within larger geographical scales than ever before (Zimmerer 2006). The use of larger planning units in conservation planning contributes to global efforts towards ecosystem-based management that captures both wider environmental processes and environment-human interactions (Grumbine 1996; Haeuber 1996; Slocombe 1993). Large marine ecosystems (LMEs) and marine ecoregions provide a rationale for large-scale conservation planning in the marine environment, (Beck & Odaya 2001; Leslie 2005; Miclat et al. 2006; Sherman 1994; Sherman et al. 2005; Spalding et al. 2007). Another feature of scaling-up efforts in biodiversity conservation is the design of protected areas, in both terrestrial and marine environments, as networks constituted by individual conservation units linked by dispersal corridors (Francis 2008). The expansion of marine environmental protection is expected to be partially achieved through the creation of networks of MPAs (IUCN-WCPA 2008). While individual MPAs could be large enough to encompass the geographical scale of the processes that sustain marine ecosystems and thus contribute to marine ecosystem-based management (Leslie 2005), potential ecological benefits could easily be offset by the costs of managing and enforcing regulations in such a large area (UNEP-WCMC 2008). Alternatively, MPAs can be organized as networks of individual conservation units linked by larval dispersal and recruitment and by juvenile and adult migrations (Christie et al. 2010; Gerber & Heppell 2004; Lubchenco et al. 2003). A network of MPAs[4] is

> *"a collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels designed to meet objectives that a single reserve cannot achieve"* (IUCN-WCPA 2008).

Protecting sites that export larvae and adults (sources) to other places (sinks) can increase the effectiveness of the network (Crowder et al. 2000). By optimizing marine conservation efforts, all the individual MPAs in a network will occupy a smaller area than

[4] MPA networks are sometimes referred to as MPA systems. The term network is here preferred as it is perceived to speak to the inherent interconnectedness of its individual MPAs. Others have argued in favor of the term systems, because of their understanding of networks as a form of social structure (UNEP-WCMC 2008).

if a single MPA was to be established covering the same range. In addition to connectivity, which is not synonymous to continuity between MPA units, other criteria for network design are representativeness and replication. MPAs in the network ensure protection to samples of each habitat, species or relevant biophysical features found in a particular ecosystem. Also, each habitat is included in more than an individual MPA. This provides a safeguard against stochastic events and other threats that might affect an individual MPA but not the whole network. As a result, each MPA does not necessarily include the same habitats as the others, or covers the same area of each habitat. MPA networks tend to span a wider geographical area, thus protecting a larger number of habitats and species but also affecting a larger number of people who use marine resources and often depend on them for their livelihoods. Experience with establishing MPA networks is still developing (Gaines et al. 2010). While it is consensual that MPA network creation must attend to ecological criteria, as well as socio-economic and institutional aspects, there seem to be different practices in this regard (IUCN-WCPA 2008; UNEP-WCMC 2008). For example, in the Philippines, an MPA network has been created based on existing MPAs that were not initially set to constitute a network. Therefore, attention is being paid not only to ecological criteria but also to the institutional challenges posed by community-based management of each MPA unit within the network, namely community heterogeneity, external influences, and the fit between MPA networks as institutions and the marine environment (Lowry et al. 2009).

Third, while scaling-up conservation planning acknowledges the natural borders of ecosystems, other forms of ecosystem-based conservation are emerging across political boundaries. Transboundary protected areas (TBPAs) are:

> *"an area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means"* (Sandwith et al. 2001).

TBPAs represent a new paradigm in nature conservation initiated in 1925 with the creation of the Albert National Park by the Belgian colonial administration of Congo and

Rwanda-Urundi (van der Linde et al. 2001). Since then, more TBPAs have been created, particularly in the last two decades: in 1988, 70 transboundary protected areas had been identified, with that number increasing to 136 TBPAs in 1997 and to 180 adjoining protected areas in 2007 (Lysenko et al. 2007; Thorsell & Harrison 1990; Zbicz & Green 1997). In the marine environment, experience in transboundary protected areas is still confined to a very few – though successful – cases. Examples of transboundary MPAs include the Turtle Islands Heritage Protected Area between Malaysia and the Philippines; the Red Sea Marine Peace Park between Israel and Jordan; the Pelagos Sanctuary for Mediterranean Marine Mammals, established jointly by France, Italy and Monaco; and the Wadden Sea between Denmark, Germany and the Netherlands (Crosby et al. 2002; Enemark et al. 1998; Notarbartolo di Sciara et al. 2008; WWF-Philippines 2005).

Fourth, and in clear contrast with the shift towards scaled-up and transboundary conservation planning efforts, protected areas are observing a scaling-down, or decentralization, of management and decision-making through the proliferation of community-based management, whereby affected and interested actors take an active part in decision-making (Dearden et al. 2005; Locke & Dearden 2005; Phillips 2003; Pimbert 2003; Zimmerer 2006). The situation in the marine realm is not different. Science-based MPAs were initially created in a top-down fashion, promoted essentially by governments, with few or no support from local communities and a focus on set-aside (Jones 2002). As experience grew around the globe, distinct management arrangements emerged to deal with rising conflicts (Balint 2006). Community-based MPAs have proliferated in the last two decades, particularly in developing countries where people are more dependent on the marine environment (Alcala 1998; Christie & White 1997; Gerhardinger et al. 2009). More MPAs have been created by local communities, frequently with some government intervention, and greater emphasis on multiple use (Jones 2002). Many community-based MPAs have also been created in reaction to the absence of governmental intervention to address marine environmental problems (Luttinger 1997). Decentralization of MPA management has therefore resulted from the devolution of power to local communities, in some cases, and from collective action where centralized governments lacked capacity or will to address marine issues. Calls for greater attention to the human dimensions of MPAs have surfaced too in reaction to MPA failures (Christie 2004; Christie et al. 2003; Mascia 2003).

1.1.4 Transboundary Networks of Marine Protected Areas

General trends in nature conservation are reflected in recent changes in marine conservation strategies. The number of MPAs has increased and is expected to expand further to meet international set coverage targets, namely the 2012 target of protection of 20-30% of the marine environment, which also contributes to Goal #7 (Ensure Environmental Sustainability) of the Millennium Development Goals (CBD 2005; UN 2008; Wood et al. 2008). Larger spatial scales are being adopted in marine conservation planning efforts worldwide, both by NGOs and national governments. Networks of marine protected areas are likely to make substantial contributions to MPA expansion efforts, as they afford conservation to the marine environment in a more efficient fashion than single, large MPAs (IUCN-WCPA 2008; UNEP-WCMC 2008). Scaling up marine conservation will often necessitate cooperation between states over their maritime borders, as marine ecosystems do not abide to administrative divisions. Simultaneously and almost paradoxically, decentralization of management authority is associated with devolution of power to local communities, whose participation in managing the resources on which they depend is considered key to their sustainable use and conservation.

These four aspects of marine conservation trends converge in the concept of transboundary networks of marine protected areas. These MPA networks straddle maritime boundaries of two or more states, are linked ecologically by larvae dispersal and juvenile and adult migration, and may also comprise community-based MPAs. Transboundary networks of marine protected areas are a particular strategy that states may adopt in face of their interdependency in relation to the marine environment. If an individual MPA within one of such transboundary networks overlaps with a maritime boundary, adjoining or opposite coastal states engaged in such cooperative arrangements will need to collaborate with each other by coordinating their actions.

Such form of bilateral cooperation in marine conservation cannot ignore the conditions of the marine environment at the local level, namely how marine resources are used, how this use impacts on their sustainability, how successful existing institutional arrangements have been in managing marine resources locally and nationally, and how existing arrangements may be influenced by external factors. Additionally, when considering the implementation of transboundary networks of MPAs, it is essential to consider the international legal framework assisting in the implementation of such

solutions, assert the willingness of states to cooperate, and devise an institutional design for the governance of TBNMPAs that is most adequate to the specific context. Due to their large spatial scale, transboundary networks of MPAs will affect a wider range of actors at various levels, such as local residents, seasonal migrants, local NGOs, international NGOs, local branches of central government agencies, etc. As each actor contributes differently to the pool of values, interests and behaviors at stake in TBNMPA-related decision-making, the potential for conflict regarding the creation of transboundary networks of MPAs will be higher (Paavola 2005). Finally, because global experience with MPA networks is still limited, and so far there is no knowledge of the existence of any TBNMPA, it is timely and appropriate to examine if cooperation in the creation of transboundary networks of MPAs is possible, and if yes, how can that be achieved (IUCN-WCPA 2008; Lowry et al. 2009; UNEP-WCMC 2008).

1.2 Purpose

This research is an interdisciplinary study of the governance requirements of transboundary networks of marine protected areas. Its purpose is to investigate the possibility of bilateral, and potentially trilateral, cooperation for the creation and management of transboundary networks of MPAs, and the requirements of such forms of cooperation.

The thesis uses a case study approach (Yin 2003) and environmental governance as its analytical framework to examine how marine resources requiring conservation measures are governed at the local level, assess the potential for bilateral cooperation in the creation and management of transboundary networks of marine protected areas, and propose bilateral institutional designs for the management of transboundary networks of MPAs in face of local marine conservation challenges.

1.3 Propositions and Research Questions

This research will be guided by several theoretical propositions. A theoretical proposition is "a [hypothetical] story about why acts, events, structure, and thoughts occur" (Sutton & Staw 1995; Yin 2003). The propositions now presented foreshadow the theories discussed later in Chapter 2 – common pool resource theory and regime theory – and recognize the prospective nature of this inquiry:

- Shared natural resources create interdependencies among states;
- Threats to shared natural resources are better addressed through international cooperation by making a state's actions contingent on other states' actions;
- International cooperation is more likely to emerge when states' power, interests and knowledge converge;
- International cooperation is more likely to be maintained by reflecting states' power, interests and knowledge in the regime's institutional design.

These propositions inform the research question of this inquiry, which will be applied to the potential establishment of transboundary networks of MPAs in selected geographical areas:

> *What are the governance requirements that may facilitate cooperation in the conservation of shared natural resources?*

This research question will be answered in relation to the potential establishment of transboundary networks of MPAs in East Africa (Fig. 1). Two geographically distinct cases are examined: the possible creation of a transboundary network of MPAs between Mozambique and Tanzania; and the possible creation of a transboundary network of MPAs between Mozambique and South Africa.

1.4 Interdisciplinarity

Answering this research question requires an interdisciplinary approach because of the nature of the problem posed. Interdisciplinarity can be defined as "bringing together distinctive components of two or more disciplines" (Nissani 1997). The problem of cooperation between states for the conservation of the marine environment through the creation of TBNMPAs is both an environmental problem and a legal-political problem.

As an environmental problem, it concerns how marine resources (i.e., specific species and habitats) are appropriated and used, how this affects their conservation, and how interdependencies between states are created through appropriation and use of marine resources. Given the complexity of the marine environment that can be expected in areas to where TBNMPAs have been proposed, natural sciences will be essential to understand its biophysical characteristics and how these influence selected species and

habitats. The environment, however, be it terrestrial or marine, cannot be seen exclusively from an ecological perspective. Except for extremely remote and/or inhabited areas, most environments will have human population that depends, directly or indirectly, on coastal and marine resources. Their needs and interests cannot be ignored and need to be taken into consideration as well. Natural sciences are not capable of dealing with the human dimensions of transboundary marine conservation, and hence the need for their integration with social sciences.

As a legal-political problem, this research concerns the type of threats posed to marine biodiversity, how these threats are addressed, how MPAs are established in each state to deal with specific threats, how these threats and other contextual regional issues affect each state's willingness to cooperate, and how this cooperation can be institutionalized. The investigation of these aspects requires the use of disciplines such as law, environmental management, environmental policy and political science.

In addition to the general nature of the problem at hand, it should also be noted that research associated with MPAs is increasingly of an interdisciplinary nature, and no longer the exclusive realm of natural sciences. MPAs pose environmental problems that require solutions to be drawn from the natural and the social sciences (Buanes & Jentoft 2009). Though MPAs are generally seen as tools for marine conservation, they achieve this through the regulation of human activities that impact on the marine environment. Hence, MPAs are not only a tool for biodiversity conservation but essentially a tool for the regulation of human behavior. Consequently, the study of MPAs increasingly necessitates insights from the social sciences, and greatly benefits from their use in addition to that of the natural sciences.

Yet, using natural sciences and social sciences is not sufficient for an interdisciplinary approach if their use is limited to independent applications of their multiple disciplines. Interdisciplinary research benefits from the interaction between several disciplines in a cross-cutting way. This cross-cutting nature of the production of interdisciplinarity is reflected in the research papers that constitute this thesis. The seven research papers constitute autonomous but inter-related chapters, each providing different snapshots of the problem at hand.

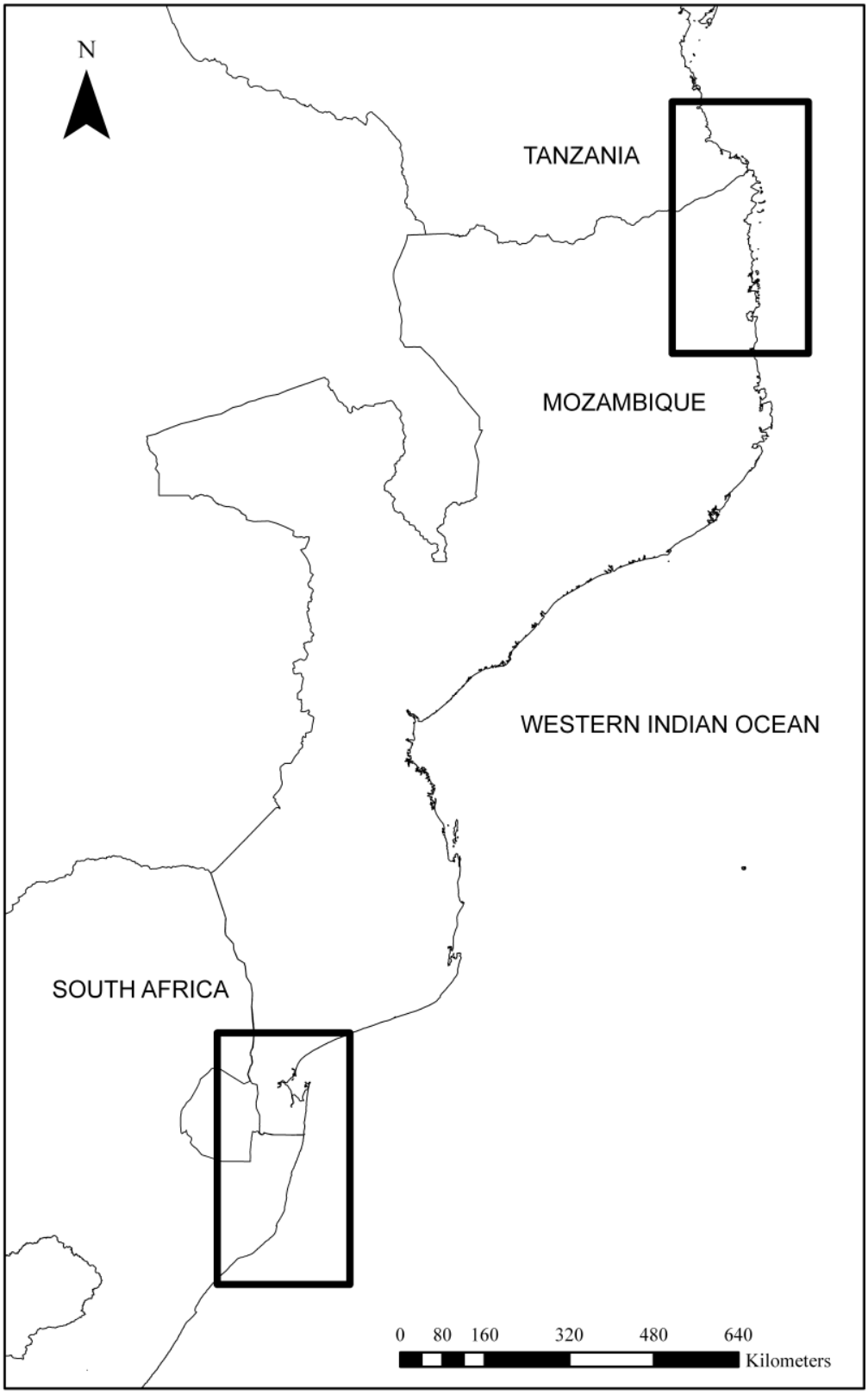

Figure 1 – Location of case study areas in East Africa

1.5 Structure of the Thesis

The thesis is structured as follows. In addition to this introductory chapter, Part I of the thesis includes two other chapters. Chapter 2 presents governance as an analytical and theoretical framework through the utilization of two distinct theories – common pool resource theory and regime theory. Chapter 3 describes the research scope, approach and design, presents the research subquestions, and outlines the methods used to answer them.

Part II of the thesis is formed by seven research papers that answer the general research question, as well as the subquestions detailed in section 3.3.2. In Chapter 4, Grilo (Submitted) explores the characteristics of marine resources necessitating conservation efforts, how these characteristics may influence states' preferences regarding international cooperation for their conservation, and how adequate transboundary MPAs are for their protection. In Chapter 5, Chircop *et al.* (2010) compare the domestic governance frameworks of East African states in relation to MPA creation and management, signaling gaps and mismatches. In Chapter 6, Guerreiro *et al.* (2011) examine the extent to which international environmental law can assist the creation and management of transboundary MPAs in this region. In Chapter 7, Grilo *et al.* (*In prep.*) analyze what may drive, facilitate or complicate cooperation in the creation and management of transboundary marine protected areas. In Chapter 8, Guerreiro *et al.* (2010) explore diplomatic and political options that states in East Africa may consider for their cooperation in the protection of their shared marine environment. In Chapter 9, Grilo (2011) explores the role of institutional interplay in bridging top-down and bottom-up marine conservation approaches by focusing on the specific case of MPA networks that include community-based MPAs, a potential approach to MPA-making in East Africa. In Chapter 10, Grilo (2010) assesses how maritime boundary-making affects cooperation in the creation of transboundary MPAs.

In Part III, Chapter 11 synthesizes the findings of these papers by revisiting their logic relationship and limitations, and provides conclusive remarks while suggesting theoretical generalizations. Recommendations regarding transboundary marine conservation and further research are given.

2. GOVERNANCE AND MARINE PROTECTED AREAS

2.1 Governance

Governance is a rather recent concept that is subjected to various interpretations. This section introduces the concept by outlining its short life and its meaning for the purpose of this thesis. It then focuses on the particular field of environmental governance, which broadly concerns how actors interact to regulate access and use of natural resources. In this chapter, I resort to common pool resource theory and regime theory to build the theoretical underpinnings that will assist in the examination of the governance requirements of transboundary networks of MPAs.

2.1.1 The Emergence of Governance

A top-down, centralized form of government resulting from representative political systems has been dominant for many decades. Based on a rigid idea of sovereignty, this traditional form of government that operated through "command and control" of society and markets has been greatly impacted by the increased complexities in societal and economic organization arising from the globalization process (Finger 1999). New economic powers have emerged, challenging the post-war hegemony of the United States and increasing the integration of markets; states have become more interdependent, engaging in new forms of global cooperation; and new social movements have erupted, questioning traditional forms of government and claiming rights to less visible constituencies (Jessop 1995).

As a consequence, the boundaries defining the state-market-civil society trinity have blurred, and new actors multiplied at various scales. In this more complex setting, governments are now confronted with public problems that often straddle disciplinary and jurisdictional boundaries, making the limitations of government action more apparent (Frederickson 1999).

These changes have motivated shifts demands for how societies should be governed. Governments have acknowledged the relevance of other actors in governing society (Stoker 1998) by strengthening their linkages to them. Actors as diverse as the private sector, non-governmental organizations and individual citizens have been

progressively included in decision-making processes at multiple levels, ranging from global, through regional, to the local level. The inclusion of actors in decision-making processes has been further expanded by shifting the *loci* from where authority for command, administration, management and control emanates (Kersbergen & van Waarden 2004). Through decentralization, the establishment of partnerships with non-governmental actors, and privatization, central governments have been "hollowed out" by flows of power that move upwards to supra-national organizations, and downwards and sideways to decentralized organizations (Rhodes 1994). It comes then without surprise that centralized power has been challenged, reflecting the interdependence that characterizes our time (Schrijver 1995). States do not directly control the global organization that regulates global trade (Finger 1999); domestic policies and legislation may be dictated by regional integration organizations like the European Union (Alter 2000); and solutions to environmental problems may be discussed at the global level, by *fora* of NGOs, and state and business representatives, for local implementation (Clark et al. 1998).

These shifts towards an enlarged citizenry in the exercise of government and the blurring of boundaries between the state and other actors are the most common interpretation of governance. The concept of governance was primarily promoted by the World Bank at the end of the Cold War as "the manner in which power is exercised in the management of a country's economic and social resources for development" (World Bank 1992). This change in the World Bank's apolitical position resulted of its concerns with the lack of effectiveness of many programs and projects it supported (Doornbos 2003; World Bank 1992). The concept soon permeated the discourse of many aid donors, development agencies and intergovernmental organizations, undertaking a transformation into "good governance" (Asian Development Bank 1995; CEC 2001; UNDP 1997a). It has also been the focus of a major undertaking by the United Nations at increasing multilateralism in international relations between states. In sponsoring the work of the Commission on Global Governance, the United Nations tried to capitalize on the growing interdependency of states by promoting cooperation in dealing with issues like security, sustainable development, democratization, equity, human rights, and humanitarian action (Commission on Global Governance 1995).

The discussions at the global level have been reinforced by empirical evidence supporting the significant role of good governance in attaining better development

(Kaufmann et al. 1999), which supported earlier arguments favoring governance as an essential condition to sustainable development (Ginther 1995).

Tracing the origins of governance does not provide a measure of its impact on scholarship, and how it has been used in theory development. The next section deals with the multiple meanings of governance, its fields of application, and its analytical role.

2.1.2 Understanding Governance

The previously mentioned World Bank's definition of governance is narrowly concerned with the behavior of states and their governments, attributing them the lead role in decision-making. Other definitions of governance reflect a greater diversity of actors, highlighting the importance of their roles.

Rhodes (1996), Finger (1999) and Kersbergen & van Waarden (2004) have identified at least eight different meanings to governance, pointing to the lack of unanimity in the usage of the concept.[5] Governance can refer to different scales (local or global), sectors of activity (private or public) or how actors are organized (hierarchies, markets or networks). Some uses are very specific (i.e. minimal state), while others may reflect more mature bodies of theory. That is the case of common pool resources theory and regime theory. These two theories operate at very distinct scales, and have preceded the emergence of the governance concept. Common pool resources theory studies the conditions that enable local responses to the frequent lack of capacity of central political authorities to create, implement, and sustain regimes, while regime theory assumes that global actors overcome an otherwise anarchical arena by cooperating to achieve shared goals that will bring them greater net benefits than the *status quo* (Keohane & Ostrom 1995; Young 1994). Despite these differences, both theories share a primary concern with

[5] Rhodes (1996) associates the use of governance with good governance, corporate governance, new public management, self-organizing networks, the minimal state, and socio-cybernetic system. Finger defines governance as comprising the following concepts and theories: structural or "good governance", regime theory, common pool resources theory, and global governance. Kersbergen & van Waarden (2004) name as many as eight different applications of governance: good governance; governing without government as in international relations; governing without government, as in self-organization; economic governance (with or without the state), through markets and their institutions; "good governance" in the private sector, through corporate governance; "good governance" in the public sector, through new public management; governance in and by networks; network governance, as in multilevel governance; and network governance in the private sector, depicting a shift from hierarchies to networks.

the behavior of actors in establishing and adopting rules governing a resource or an issue of common concern for the collective good.

Governance congregates several theories on cooperation, but it is not in itself a theory. Instead, its value lies in constituting a "bridge between disciplines" that provides an organizational framework to examine changes in governance processes, and thus combine the essential of the various uses of the concept (Kersbergen & van Waarden 2004; Löffler 2003; Stoker 1998). Five propositions define governance as a framework of analysis (Stoker 1998):

- Actors and institutions involved in government include and go beyond the government, increasing the complexity of institutional arrangements and raising issues of legitimacy of non-State actors (Swyngedouw 2005).
- There is a blurring of the boundaries and responsibilities for government between the various actors and institutions. This obscures the allocation of responsibility for unexpected consequences of decisions, and complicates accountability (Jessop 2005).
- Governance acknowledges the power interdependence between actors and institutions involved in collective action (Paavola 2007). Partnerships between different actors are likely to emerge, evoking the collaborative nature of governance processes (e.g., Wallington et al. 2008).
- Governance is enabled by the emergence of self-organized networks of actors, which not only can influence government but also take over its role (Rhodes 1996). This decentralization of governmental responsibilities to outside the sphere of government introduces difficulties in keeping decision-makers accountable (e.g., Batterbury & Fernando 2006).
- Consequently, governance recognizes that government is not the only source of authoritative power for decision-making (Kersbergen & van Waarden 2004). This demands coordination efforts from the government, as well as the capacity to adapt to changing conditions (Duit & Galaz 2008). The uncertainty associated with a permanently changing environment may complicate governability by increasing the likelihood of governance failure. Finally, governance reminds us that electoral processes, though necessary, are not sufficient to establish legitimacy in decision-making (Huang et al. 2008).

These propositions implicitly deny the state any privileged role in governance processes, though they do not neglect its importance. They suggest that governance is more than inputs and outputs, being instead concerned with the quality of decision-making processes whereby different actors interact to advance their own interests (Löffler 2003). The propositions suggest too that the examination of governance raises questions about governability, accountability and legitimacy (Kersbergen & van Waarden 2004). Nine principles have been proposed to achieve good governance for sustainable development: participation of all through legitimate institutions representing their interests; rule of law ensuring respect for human rights; transparency of decision-making processes; responsiveness to a changing socio-economic environment; consensus orientation for a common position that reflects various interests; equity in opportunities to improve and maintain well-being; effectiveness and efficiency of institutions in producing results meeting societal needs; accountability of decision-makers; and strategic vision for good governance and human development (UNDP 1997a, b).

In this thesis, governance provides an analytical framework that considers multiple scales and presumes the incorporation of all relevant actors, independent of their organizational structure or sector of activity. Governance is therefore essentially concerned with the potential cooperative behavior of actors at various levels and in relation to decisions that affect or interest them collectively.

The following section elaborates briefly on environmental governance and describes in greater detail its two main constitutive theories.

2.1.3 Environmental Governance

The global changes observed in the last few decades have lead to an increased interdependency at the economic, political, social and cultural levels, affecting how human societies relate to their natural environment. The different scales at which natural resources originate conflicts have rendered distinct analysis about how individuals may cooperate to regulate access and use of natural resources. Until recently, environmental governance literature has been divided into two streams of analysis in what concerns the role of formal and informal institutions in governing natural resources. On the one hand, common pool resource theory concentrates on the conditions that enable self-organized, localized and sustained institutional arrangements that have emerged as an alternative to

centralized political authority, markets and private property in avoiding or at least reducing the effects of the "tragedy of the commons" (Hardin 1968; Ostrom 1990). On the other hand, regime theory (a field of international relations) is more generally preoccupied with the conditions that foster cooperation in an otherwise anarchical global society to overcome distinct situations that include, but are not limited to, the collective action problems posed by common pool resources (CPRs) (Young 1995). Both these theories are instrumental to the objectives of this study. Common pool resource theory is adequate to examine the conditions facing potential transboundary networks of MPAs in each of the study sites. Moreover, it will contribute to evaluate the potential for collective action, a necessary condition for the success of increasingly important community-based MPAs. Finally, common pool resource theory is appropriate to the study of MPAs given their property-right nature, which is closely linked to their capacity to regulate human behavior. In contrast, regime theory provides a comprehensive framework to evaluate the potentially facilitating and constraining factors in the emergence of cooperation for the creation of transboundary networks of MPAs. The combination of common pool resource theory and regime theory will then inform the construction of possible institutional designs that may be better equipped to deal with the specificities of each study area. The motivations for the choice of both theories are elaborated in greater detail in sections 2.2.6 and 2.3.6, respectively.

In the following sections the general underpinnings of both common pool resource theory and regime theory are examined. Their strengths and limitations are presented, as well as the relevance of both theories for the study of the governance requirements of transboundary networks of MPAs examined.

2.2 Common Pool Resource Theory

2.2.1 Common Pool Resources

Typically, goods have been classified in private, public, club or common-pool goods according to their subtractability and excludability (Table 1). A good is subtractable, or generates rivalry, when extraction by one user reduces the amount of good available to others. It is excludable when its removal can be limited to some users, and others excluded from harvesting it, and not too costly. Common pool resources (CPRs) can be defined as "a class of resources for which exclusion is difficult and joint use involves

subtractability" (Berkes et al. 1989). Common examples of CPRs include groundwater, fisheries, and forests. In the case of migratory fisheries, exclusion is particularly difficult to attain given the sizeable area the resource may span.

Table 1 – Types of goods

	Subtractable	Non-subtractable
Excludable	Private goods	Club goods[6]
Non-excludable	Common pool goods/resources	Public goods

Because of their non-excludability, public and common pool goods pose collective action problems. Collective action problems are situations in which individual actors have more to benefit from coordinating their actions with others than from pursuing their own self-interest. Such problems can usually be divided into problems of allocation (i.e., how much of the good can be extracted, how, where, when, and by whom) and provision of the good (i.e., how is the good going to be supplied so that users can continue enjoying it). A common collective action problem is that of free-riding, where users enjoying the benefits of the good refuse to contribute to its provision. Standard solutions to collective action problems have included, among others, technology that fences off non-contributors, or the creation of property rights (Ostrom 2003). Any of these two solutions to exclude non-contributors may entail significant costs. However, these costs can be overcome, with common pool goods being quite frequently owned jointly by an identifiable group of users that are able to exclude others and regulate their own use.[7] That common pool goods can sometimes be governed by successfully excluding non-contributors is not a characteristic of these goods, but instead a social consequence of the creation of property entitlements.

2.2.2 Property Regimes

[6] Club goods are considered a special case of public goods that are evident when a public good is excludable. The electromagnetic spectrum for satellite television is an example of a club good.

[7] In the case of public goods, restriction to a reduced number of users is not so desirable as they would be the sole providers of a good that everybody would be able to enjoy, as individual use does not impede the use by others (Ostrom 2003).

Property is a social construction that defines the relationship between individuals in relation to a certain entity. As such, property can only exist if it is recognized by not only the individual or group that claims it, but also by the rest of society that is excluded from benefiting from such property (Bromley 1992). Property rights, or claims of ownership over something, are not a direct derivation of the resource characteristics bridged in the previous section, but are instead negotiated and determined by individuals (Gibbs & Bromley 1989). This means that a single property regime may apply to different types of goods, and that a type of good may be held under different property regimes.

Three different property regimes can be defined: private property, public property (*res publica*), and common property (*res communes*) (Bromley 1992; Feeny et al. 1990). For each regime, clear property rights define who may use a resource, when, and how. Property regimes arise out of a societal perception of what is scarce enough and valuable enough to be regulated (Bromley 1992). A public property is owned by the citizens and controlled by the state that represents them, while with private property those functions are ensured by an individual. In contrast, common property regimes are characterized by ownership and control over use of a resource being secured by a group of users. Common property regimes can be defined as:

> "*structured ownership arrangements within which management rules are developed, group size is known and enforced, incentives exist for co-owners to follow the accepted institutional arrangements, and sanctions work to insure compliance*" (Bromley & Cernea 1989).

Though the distinction between property regimes is theoretically useful, it is seldom clear in reality. Any given good may not be permanently subject to a single form of property (Ostrom 2002). It may shift from common property to public property, as in the case of appropriation by the State of once communal grounds. A good may also be simultaneously held under more than one form of property. For example, coastal fisheries are often *de jure* public property but *de facto* common property, with coastal communities negotiating and implementing their own rules for harvesting fish resources (Schlager & Ostrom 1992). These overlaps and shifts in property rights highlight their independency from the physical characteristics of the resource, demonstrating instead that they are socially constructed, though the choice of one property regime over other is informed by the nature of the resource, among other factors (Bromley 1992).

In some situations, though, property rights may not be defined or enforced and the resource is then considered to be open access, or under a non-property regime (*res nullius*) (Gibbs & Bromley 1989). Resources that are open access are often confused with resources under a common property regime. This misunderstanding may be explained by the frequent conversion of common property regimes into *de jure* public property that is not enforced, leaving the resource to be used on a first-come-first-served basis (Bromley 1992). However, they are quite different, as property rights in the latter are present and enforced.

2.2.3 The Rise of Common Pool Resource Theory

Common property regimes have been portrayed as problematic at least since William Forster Lloyd's work in 1833 (Baden & Noonan 1998). More than one hundred years later, in his "The Tragedy of the Commons", Hardin (1968) picked up on Lloyd's analogy of the problems faced by herdsmen sharing a grazing land, highlighting the problems associated with resource scarcity and their relationship with property rights regimes:

> "*Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons.* (...) *As a rational being, each herdsman seeks to maximize his gain.* (...) *the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another.... But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit - in a world that is limited.* (...) *Freedom in a commons brings ruin to all*." (Hardin 1968)

Hardin (1968) argued in this way that scarce resources that are held in common are deemed to be overexploited or even exhausted. As the benefits of use are concentrated on each individual and the costs are divided by all, individual interests prevail over community ones originating the "tragedy of the commons". According to Hardin, the collective action dilemmas arisen could only be avoided by converting them into private or public property, an idea that had been advanced a few years before (Gordon 1954;

Scott 1955). The possibility of individuals communicating with each other and organizing for the common good was not even considered as an alternative solution. Instead, an external enforcement authority was offered as the solution.

Hardin's claim is supported by some empirical evidence. Common property regimes have rather frequently not been successful in sustaining their existence and avoiding congestion or even resource depletion, to which responsibilities communities cannot be alienated from (McCay & Jentoft 1998). Users may be too individualistic, jeopardizing the survival and effectiveness of such regimes. When common property regimes are not adequate to deal with resource scarcity, public or private property regimes may be more appropriate (Lino Grima & Berkes 1989; Symes & Crean 1995).

Yet, there is also evidence showing that common property regimes have played a fundamental role through time and place. Communities have organized to regulate the use of resources and managed to escape "tragedy" without external intervention of markets or central authorities (Berkes et al. 1989). Many of these regimes have evolved and existed over decades, sometimes even centuries, and have allowed communities to sustain their livelihoods, and in some cases to contribute to environmental conservation (Berkes 2004; Ciriacy-Wantrup & Bishop 1975).

The awareness that common property regimes can be quite successful has fuelled scholarship efforts into understanding how they have overcome the "tragedy of the commons". A first step has been to refute Hardin's conclusion that commonly held resources are doomed to be depleted. One of the main criticisms that have been conveyed towards Hardin's argument (1968) is that he posits the grazing land in his analogy to be held under a common property regime (Bromley & Cernea 1989; Feeny et al. 1990; Ostrom 1990). Duly enforced common property rights do not match the description of Hardin's "commons". In fact, Hardin's conceptualization of commons resembles that of resources under an open access regime (Ciriacy-Wantrup & Bishop 1975).

Moreover, the arguments advanced to reach the final policy prescription – that the problems of common property regimes can only be solved by changing the nature of the property rights – ignored three important aspects related to individual behavior, local practices, and property rights. Firstly, Hardin assumed that individual behavior is driven solely by rational maximization of one's utility. In doing so, he failed to recognize other factors that may influence behavior, such as norms and values. Individual actions may be

guided by a person's concerns with the impacts her actions may have on the rest of the community to which she belongs and within which most of her social interactions reside. Moral norms may influence a person's behavior either by refraining their rent-seeking behavior from overriding the maximization of collective utility, or by reinforcing the sense of community, where mutual trust is developed (Baland & Platteau 1996). Secondly, public property and private property are not always the norm in many societies. For example, while private property may be more economically efficient than common property, it is often so at the expenses of equity as it usually generates asymmetries in the concentration of wealth (Baland & Platteau 1996; Berkes 1989a). Communities in several parts of the world have thus pooled their abilities and designed more appropriate institutional responses to the local resource conditions they face, namely common property regimes (Gibbs & Bromley 1989). Thirdly, while property rights systems may succumb because of community factors such as the pursuit of self-interest, they can also be crippled by external factors, such as the emergence of markets or state intervention. These are powerful enough to alter an existing property regime and have sometimes been responsible for the collapse of functional common property regimes.

Exposing the fragilities of Hardin's argument has therefore led to the recognition that the theory of the state and the theory of the firm, proposing respectively public property and private property as solutions to independent action in situations of interdependency, are not capable of explaining the emergence of institutional arrangements for self-organization and self-government of common pool resources (Ostrom 1990). Several authors have thus showed how local collective action problems associated with a large variety of common pool resources have been solved through cooperative behavior that has avoided the collapse or at least reduced the deterioration of the commons through the provision of new institutions, the creation of credible commitments and mutual monitoring (Baland & Platteau 1996; Berkes 1989a; Bromley & Cernea 1989; NRC 1986; Ostrom 1990; Wade 1988). These and other studies highlight the importance of community involvement in the management of natural resources. Notwithstanding, their most significant contribution is an evolving body of knowledge - common pool resource theory – that has empirically and theoretically explained how individuals can and do organize themselves to overcome collective problems (Ostrom 2000a). Additionally, scholars have attempted quite successfully to elicit the conditions

under which common property regimes can emerge and be successful in regulating common pool resources.

Before proceeding with the description of these conditions and of their effects on collective action, the discussion continues on the particulars of common property regimes governing common pool resources.

2.2.4 Common Pool Resources Governed by Common Property Regimes

The subtractability of common pool resources generates interdependency among users, and is further complicated by the high costs of excluding other users (Paavola 2005). These two characteristics hinder collective action in the management of CPRs, as individual short-term interests diverge from collective long-term interests (Cox 2008; Feeny et al. 1990; Ostrom et al. 1999). If users conclude that collective action can bring them more benefits that exceed short- and long-term costs, then they will cooperate to bring institutional change (Ostrom 2000a). Cooperation is a necessary condition for common property regimes governing common pool resources. The benefits of cooperation in the use of common pool resources are two-folded. It enables users to restrain their rent seeking-behavior from negatively impacting on the wealth of others, and it yields greater total net benefits than independent action (Ostrom 1990, 2003). By prioritizing long-term community benefits over individual immediate ones, CPR users can facilitate the emergence of successful common property regimes.

To better understand the role of common property in governing CPRs, as well as the related collective problems, it is necessary to make a distinction between the resource system and its resource units. A resource system can be considered a stock variable that has the ability of generating a flow of resource units without jeopardizing itself , while a resource unit is what appropriators extract from resource systems (Ostrom 1990). If different resource units are available from a given CPR system, users may be interested in extracting more than one type of resource unit. In a resource system such as a forest, users may extract timber and harvest medicinal plants, two types of resource units. Moreover, each resource unit may be held under different property regimes. For example, medicinal plants may be extracted exclusively by a single user, while timber may be under a common property regime. The distinction between resource system as a stock variable

and resource unit as a flow variable is also useful in the case of renewable resources, as it allows the definition of a replenishment rate (Ostrom 1990).

Common property regimes try to overcome the collective action problems posed by CPRs when appropriators acting independently face suboptimal outcomes, and when there are institutional alternatives to regulate use that are more efficient than current arrangements (Gardner et al. 1990). Such problems can be divided into situations associated with the appropriation of the resource and with its provision (Figure 2) (Gardner et al. 1990). Appropriation problems concern the flow aspect of CPR systems, and emerge when the quantity of resource units appropriated is sufficiently large for users to adopt an individual behavior conducive to suboptimal outcomes. Appropriation problems concern essentially the problem of allocation of resource units among users, that is, the total amount of resource units that can be extracted. After the allocation problem has been solved, distribution becomes a concern. While allocation is in respect of common property regime membership, distribution relates to defining the share of resources each member will be entitled to (Libecap 1995). Both allocation and distribution have time, spatial and technological dimensions, which are respectively related to when, where and how can resource units be appropriated (Gardner et al. 1990).

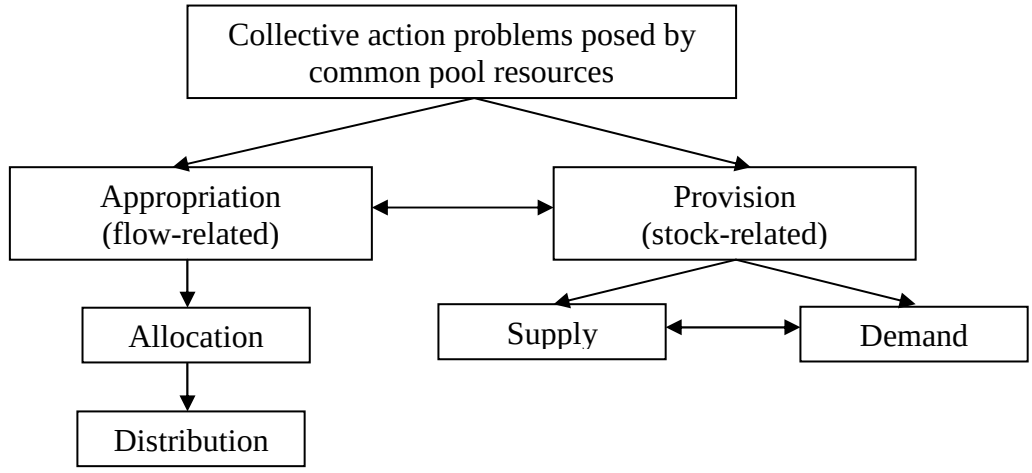

Figure 2 – Collective action problems posed by common pool resources

In turn, provision problems are related to the stock aspect of CPR systems, more concretely with ensuring that there are enough resource units to be allocated fairly among users. Provision problems are associated with the behavioral incentives to ensure adequate provision of resource units (the supply side of the problem), on the one hand,

and to maintain extraction sustainable patterns of resource extraction that avoid exhaustion of the resource (the demand side of the problem) (Gardner et al. 1990).

Securing solutions to these collective action problems within the realm of common property regimes does not ensure that these will be stable over time. Most common property regimes are instead the result of evolution over long periods of time. Common property regimes have developed through substantial trial and error in adapting to initial and changing conditions in resource use and abundance (Berkes 1989b; Ostrom 1990). Current knowledge of common property regimes is then mostly restricted to a snapshot of their recent history. Tracing back their emergence and evolution is a rather difficult task. Despite these difficulties, CPR theory has been able to generate relatively strong hypotheses regarding the conditions that enable successful common property regimes governing common pool resources. The following section describes and analyses these conditions.

2.2.5 Conditions Enabling Successful Common Property Regimes

The success of common property regimes is the product of a complex set of factors. More than forty variables have been shown to enable cooperation for the formation and maintenance of common property regimes (Agrawal 2002, 2003; Pagdee et al. 2006). Each variable, or design principle for successful common property regimes, is

> "*an essential element or condition that helps to account for the success of these institutions in sustaining CPRs and gaining the compliance of generation after generation of appropriators to the rules in use*" (Ostrom 1990).

Initial studies of CPRs have thoroughly examined the property rights governing CPRs, at the expenses of the characteristics of the resource system, some aspects of user group membership and the external social, physical, and institutional environment affecting the sustainability of CPR institutions (Agrawal 2002). In a thorough review of three studies of CPR institutions, Agrawal (2002) groups their enabling conditions into four categories (Table 2):

- characteristics of the resource system;
- characteristics of the users group;
- institutional arrangements regulating resource appropriation and provision;

- and external influences arising from state intervention, market integration and the introduction of new technologies.

The following section elaborates on these four conditions enabling successful regulation of renewable[8] CPRs, linking these with experiences in marine commons.

2.2.5.1 Resource System Characteristics

The resource system characteristic most often associated with local and successful management of the commons is its small size. Smaller CPRs are more likely to be successfully managed than larger ones because users can better control access and appropriation by enforcing rules among themselves and excluding outsiders when a resource system is small than when it is larger (Wade 1988). The boundaries of a small CPR are also easier to identify, and its dynamics easier to be understood by the CPR appropriator (Ostrom 2000a). For example, a small MPA is easier to manage, as it constitutes a smaller area to monitor and to enforce regulations.

A resource characteristic closely related to CPR size is its boundaries. Having clear boundaries yields the CPR easier to manage, as it can be clearly identified. Defining the boundaries of the CPR system is then the first step in organizing collective action (Ostrom 1990). By clearly defining what constitutes the CPR to be collectively managed, users can devise rules to address allocation and provision problems. Most importantly, clear boundaries are unavoidable if non-users are to be excluded. In the case of MPAs, clearly identifiable signs marking their boundaries are perceived to contribute towards compliance with MPA regulations by both locals and outsiders (White & Vogt 2000).

The boundaries of the CPR resource under common management are in part determined by its mobility. Defined as "the spatial movement of the [CPR] units, apart from any harvesting activity by resource users" (Schlager et al. 1994), mobility increases the complexity of the resource itself, leading to higher information costs related to the knowledge appropriators can have of the resource. Appropriators may also not be able to detect whether changes in the resource flow are caused by their own appropriation level and pattern, or from appropriators not associated with their common property system that

[8] Collective action regarding renewable resources may be more difficult than with non-renewable resources, as production may bounce back due to exogenous factors (Libecap 1995).

are able to harvest the resource beyond the resource system boundaries. For example, in the case of fisheries, if a fish stock spans a geographic area larger than the one fishers are capable of covering efficiently, information about the fishery will be harder to get, namely its size, population dynamics, how many resource units are being harvested, and the effect the harvest of a fisher may have on that of another fisher (Schlager et al. 1994). Unless the size of the user pool can match the distribution of the resource, mobile resources also hinder CPR users' capability to enforce rules, thus clouding their understanding. In the case of marine turtles, conservation efforts, including the creation of MPAs, have been directed at reducing land-based threats, even though the biggest threat to these migratory animals is fisheries bycatch (Donlan et al. 2010). In other words, coastal MPAs established for marine turtle protection fall short of dealing with their main user pool.

Table 2 – Critical enabling conditions for sustainability on the commons

I – Resource System Characteristics	II – Group Characteristics	III – Institutional Arrangements	IV – External Environment
• Small size (RW) • Well-defined boundaries (RW, EO) • Low levels of mobility • Possibilities of storage of benefits from the resource • Predictability	• Small size (RW, B&P) • Clearly defined boundaries (RW, EO) • Shared norms (B&P) • Past successful experiences – social capital (RW, B&P) • Appropriate leadership – young, familiar with changing external environments, connected to local traditional elite (B&P) • Interdependence among group members (RW, B&P) • Heterogeneity of endowments, homogeneity of identities and interests (B&P) • Low levels of poverty	• Rules are simple and easy to understand (B&P) • Locally devised access and management rules (RW, EO, B&P) • Ease in enforcement of rules (RW, EO, B&P) • Graduated sanctions (RW, EO) • Availability of low-cost adjudication (EO) • Accountability of monitors and other officials to users (EO, B&P)	• Technology: o Low-cost exclusion technology (RW) o Time for adaptation to new technologies related to the commons • Low levels of articulation with external markets • Gradual change in articulation with external markets • State: o Central governments should not undermine local authority (RW, EO) o Supportive external sanctioning institutions (B&P) o Appropriate levels of external aid to compensate local users for conservation activities (B&P) o Nested levels of appropriation, provision, enforcement, governance (EO)
I and II - Relationship between Resource System Characteristics and Group Characteristics • Overlap between user group residential location and resource location (RW, B&P) • High levels of dependence by group members on resource system (RW) • Fairness in allocation of benefits from common resources (B&P) • Low levels of user demand • Gradual changes in levels of demand			
I and III - Relationship between Resource System and Institutional Arrangements • Match restrictions on harvests to regeneration of resources (RW, EO)			

Reproduced from Agrawal (2002), p. 62-63; sources: RW (Wade 1988), EO (Ostrom 1990) and B&P (Baland & Platteau 1996).

In the case of marine fishery resources, examples abound of such CPRs that are mobile to the point of straddling multiple jurisdictions. Thus, the user pool associated with marine fishery resources can have either a multinational, national, regional, localized or traditional character,[9] depending on the mobility of the resource in relation to administrative boundaries (Table 3). The higher the mobility of the resource units, the more complex will its management be, as different jurisdictional regimes may apply. For example, an unshared stock confined to a single jurisdiction is subject to a single set of management rules, while a stock shared by two distinct jurisdictions necessitates coordination and collaboration between the respective management authorities. Difficulties in the management of migratory fish stocks are further complicated if they straddle not only national jurisdictions but also areas outside national jurisdictions (the high seas). Coordination at higher levels entails higher transaction and information costs, lending both the problems of exclusion and subtractability much harder solutions (Berkes 2006).

Table 3 – A typology of mobile fishery resources

Scale of User Pool	Migratory Pattern
Traditional Localized Regional National Multinational	• Unshared stock exists in a single jurisdiction • Shared stock exists in the jurisdiction of two or more adjacent or opposite coastal nations • Highly migratory stock is within the jurisdiction of two or more nations and exists outside any national jurisdiction • Anadromous stock lives in the fresh or estuarine waters of a single nation and outside the nation's jurisdiction on the high seas • High Seas stock exists outside national jurisdictions

(adapted from Buck, 1989)

Mobility has a direct impact on the success of MPAs. If a CPR, like a fishery that is overexploited, is present, the MPA may not be large enough to encompass its entire range and provide adequate protection. On the other hand, if one considers stationary resources like sea cucumbers and sessile mollusks such as limpets and oysters (at least at the stage of their life cycle in which they are harvestable), and even habitats such as coral reefs and mangroves, then the lack of mobility facilitates the enforcement of MPA regulations. Of course, such considerations depend on whether the conservation

[9] Traditional (internal control, little external control), localized (external political control), regional (external political control), national (internal political control), and multinational (little internal or external control).

objectives of any given MPA are oriented towards species conservation, habitat conservation, or both.

Another important resource characteristic that can enable successful CPR regimes is whether appropriated resource units can or not be stored. Storage refers to "whether the resource has storage capacity that enables users to capture and retain unharvested units" (Schlager et al. 1994). Storage of resource units allows appropriators to maintain the resource flow even in times of scarcity of production. Appropriators are then able to overcome seasonal cycles that are commonly associated with many common pool resources, such as irrigation water and migratory fisheries, and incentives to continue harvesting resource units beyond sustainable levels are thus absent (Schlager et al. 1994). Storage thus contributes to sustain a predictable flow of resource units to users.

Predictability of a resource can be defined as the ability of indicating in advance the flow of resource units in the system. A CPR system with a predictable production demands less information from the user pool, and renders the assessment of the impact management rules have on the production of the resource easier (Wilson 2002). In opposition, an unpredictable resource introduces serious difficulties in the allocation of resource units among users (Agrawal 2002). Predictability of a resource system has consequences for marine conservation too. For example, the outcomes of protection measures such as marine reserves are more difficult to predict and harder to detect in the short term, a situation that is associated with the non-linearity and unpredictability of the flow of many marine resources, and that complicates their social acceptance (Carr et al. 2003).

2.2.5.2 Group Characteristics

CPR theory has collected its empirical insights from situations that are understood to be particularly conducive to successful CPR institutions (Ostrom 1990). The most prominent feature of such institutions is the small size of the user group, a characteristic that is often associated with the already mentioned small size of the CPR system. A small group of users tends to be more capable of engaging in self-management, as members are more likely to have closer relationships, an incentive to consider the long-term outcomes of their choices instead of their individual costs and benefits (Baland & Platteau 1996). Large groups, on the contrary, are faced with much higher costs of monitoring to keep a

reasonable level of excludability in relation to outsiders (Agrawal & Goyal 2001). The small size of a user group has been associated with successful community-based MPAs (Pollnac et al. 2001). The close ties between group members also contribute to each user's knowledge of other member's preferences and interests (Baland & Platteau 1996).

Drawing a parallel with the previous discussion of resource system characteristics, closely associated with the size of the group are the boundaries delimiting the resource users, that is, determining which individuals have rights of access and appropriation of the resource, and which do not. A clear definition of the boundaries of the users group should unambiguously show who is entitled to enjoy the benefits of the resource and to share the costs of providing for it, and who is not (Ostrom 1990). The same is to be said of MPAs, where regulations stating unambiguously what activities are allowed, and where, generate in practice the user groups that are allowed to exert their activities within the MPA.

Another characteristic of user groups that has been found to be associated with successful common property regimes is the sharing of norms among all users. Shared norms, like the pursuit of utility maximization, can influence behavior of appropriators in two different ways. They may limit one's options to achieve utility maximization, or they may actually shape individual preferences (Baland & Platteau 1996). In the first case, shared norms are reflected in reciprocity (e.g., Stoffle & Minnis 2007), whereby one cooperates to the point where others cooperate too. In the second perspective, group identity arising from shared norms contributes to define individual preferences. Such group identity can facilitate the creation of an MPA, but also hinder it if the MPA is perceived to threaten that same identity (Stoffle & Minnis 2007).

The existence of shared norms among a group of users contributes to its social capital. Social capital refers to "structures of social organization such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam 1995). Then, social capital is not formed by resources held by individuals or groups of individuals, such as physical capital, but instead consists in social interactions that generate mutually beneficial outcomes for those involved (Bankston III & Zhou 2002). In fact, four differences between social capital and physical capital have been suggested (Ostrom 2000b):

- Social capital does not wear out with use, but rather with disuse;

- Social capital is not easy to observe and measure;
- Social capital is hard to construct through external interventions;
- National and regional governmental institutions strongly affect the level and type of social capital available to individuals to pursue long-term development efforts.

Past experiences that build into social capital can provide a fertile ground for the emergence of cooperative behavior among resource users, as they lower the costs of collective action (Pretty 2003). As pointed out by Ostrom (2000b), social interactions that are a constitutive part of social capital need to be sustained over time, at the danger of being eroded and not warranting the trust and social norms on which common property systems can be based on. In the case of MPAs, social capital is an important condition for their success because it enables social sanctions that deter individual opportunism (Rudd et al. 2003).

Social ties as imbedded in the concept of social capital, when combined with leadership, can dissipate the group size effect on the sustainability of common property regimes. Even when the user group is large, it has been found that leadership in the form of an authority structure to which users relate to can overcome the incentive dilution effect associated with large groups (Olson 1982; Wade 1988). Community leaders usually have the authority to resolve conflicts, support collective decisions and apply penalties to users that fail to comply with established rules. They can also exercise their authority in mobilizing a significant part of a community or resource users to participate in a CPR institution (Baland & Platteau 1996). In the case of MPAs, leadership within communities has been identified as essential to ensure the success of MPAs in general and community-based MPAs in particular (Oracion et al. 2005; Pollnac et al. 2001).

Interdependence among resource users is usually perceived as a source of conflict (Paavola 2005). However, interdependence can also enable collaboration among users, particularly when there is a significant stock of social capital. For example, interdependence among group members may give rise to preoccupations about individual reputation (Baland & Platteau 1996). Users may then be less likely to infringe resource management rules out of concern with the impact that may have on their social integration in the community. Interdependence can thus enable them to create an institutional environment that manages the effects of the natural environment to their

benefit (Astley & Van de Hen 1983). The ability of interdependence to ensure compliance with MPA rules is an important condition for MPA success (Rudd et al. 2003).

Interdependence among group members is perceived as more capable of generating cooperative behavior when users share the same interests and similar cultural identities but have different capabilities (Baland & Platteau 1996). Homogeneity in interests is often associated with small user groups, as these are more likely to share similar interests. Homogeneity of interests increases the likelihood of users cooperating in the management of a CPR, because it facilitates the definition of common objectives, and reduces the cost of negotiation and bargaining associated with the crafting of institutions (Bardhan & Dayton-Johnson 2002). Disparities in users' interests can easily derail any attempts to promote collective action. A typical example is that of marine fisheries and the conflicting interests of small-scale fishers and industrial fleets. Local fishers have usually limited mobility and therefore restrict their activity to certain fishing grounds. Industrial fleets, on the other hand, can move to distant fishing grounds when those shared with small-scale fishers are not as profitable as before, often leaving locals with a significantly less productive resource system (Baland & Platteau 1996). Homogeneity of cultural identities has an influence over the possibility of collective action similar to that of homogeneity of interests. Culturally homogeneous users share values and have a similar understanding of social problems affecting them (Bardhan & Dayton-Johnson 2002). Consequently, in creating MPAs, it is crucial to understand the interests and cultural traits of different user groups (Davos et al. 2007).

However, the link between homogeneity of interests and collective action is not linear. It has been argued that heterogeneity in users' interests may lead to collective action, though through a risky path (Libecap 1995). Heterogeneity may delay collective action, as users appropriate resource units according to their own individual interests. As resource availability is reduced, users become more homogeneous in their lower individual net benefits, a situation that may conduct to collective action, also as a consequence of some appropriators leaving the resource area in result of harvest declines.

The effect of homogeneity of identities and interests over the prospects of collective action may be reinforced by users having different endowments. Heterogeneity of endowments generates different interest intensities that enable collective action. Such situation, known as the "Olson effect", can be summarized as follows:

> "*the greater the interest in the collective good of any single member, the greater the likelihood that that member will get such a significant proportion of the total benefit of the collective good that he will gain from seeing that the good is provided, even if he has to pay for all the cost himself*" (Olson 1965).

The Olson effect makes sense when users can expect benefits proportional to their effort in producing the resource (Bardhan & Dayton-Johnson 2002). However, heterogeneous endowments may have the opposite effect. For example, fishers using gears with different harvesting efficiencies may be less likely to cooperate even if they recognize that resource conservation is a necessity (Scott 1993), thus potentially jeopardizing the success of an MPA.

The last of the group characteristics that positively affect the likelihood of common property regimes to emerge is low levels of poverty. Poor users are more likely to experience greater dependence on resources, and therefore to be less likely to prioritize communal objectives over their own benefits. In other words, consumption in the present is so fundamental that the future does not play a role in individual appropriation decisions. Poverty can hinder the pursuit of conservation goals in MPAs as poorer users are more likely to break regulations (Cinner 2009; Tobey & Torell 2006). As for other factors, the effect of poverty levels on collective action is dubious. For example, wealthier fishers may have more efficient gears and thus endure higher levels of appropriation that may jeopardize the sustainability of the resource (Agrawal 2002).

2.2.5.3 Relationship between Resource System Characteristics and Group Characteristics

The previous sections examined separately how resource and group characteristics influence collective action. These two sets of characteristics act independently, but they also interact to enable cooperative behavior. These interactions are here addressed.

The first aspect of the relationship between a resource system and the group that appropriates it is the overlap between the location of the user group and that of the resource. Users that are closer to the resource they appropriate are more capable of understanding the production dynamics of the resource and thus to better devise institutions for its collective management (Baland & Platteau 1996), as is the case of customary closure systems (Cinner et al. 2005). Users under these conditions are also

more capable of monitoring each other's activities, which may result in more efficient enforcement (King & Faasili 1998).

Secondly, resource users that are highly dependent on the resource system are more likely to engage in collective arrangements for its appropriation. This potential for collective action stems from the increased users' knowledge of how supply and demand of the resource system varies and is affected by users' behavior over time and space. However, beyond a certain level of dependence, users may just consider their own individual utility, instead of that of the community. In the case of MPAs, resource dependency appears to be inversely correlated with pro-conservation attitudes (Marshall et al. 2010).

Thirdly, rules devised to allocate resource units among users are more likely to be complied with if they reflect some collective notion of fairness (Baland & Platteau 1996). This implies that rules for self-governance of common pool resources are not devised only out of concerns with the sustainability of the resource flow, but also take into account the distributional consequences of allocation among users. In the case of MPAs, if rules are perceived to be unfair and not legitimate, users will be less likely to comply with them (Christie 2004; Oracion et al. 2005).

Fourth, low levels of user demand have a greater potential to facilitate the emergence of common property regimes, as this is less likely to impact on the scarcity of the resource. Demand may increase due to the influence of external factors, such as demographic changes, market integration or technological development of appropriation tools (Agrawal 2002). Market integration has been found to be inversely correlated with the conservation effectiveness of MPAs (McClanahan et al. 2006).

Fifth, when changes in demand levels do take place, they are less likely to affect the prospects of collective action if they are gradual. Slow-paced changes in resource demand facilitate an understanding of its causes and outcomes, allowing collective action to account for this knowledge in crafting appropriate institutions. Resource demand may increase due to immigration. For example, migrant fishers in northern Mozambique are considered a threat to the protection of the marine environment of a local MPA (Rosendo et al. 2011).

2.2.5.4 Institutional Arrangements

Another set of enabling conditions that have a significant effect on CPR regimes pertain the institutional arrangements regulating CPRs. Here, institutional arrangements concern formal and/or informal rules prescribing the following types of rights (Ostrom 2003; Schlager & Ostrom 1992):

- Access: the right to enter a defined physical area and enjoy non-subtractable benefits;
- Withdrawal: the right to extract a resource;
- Management: the right to regulate withdrawal rights;
- Exclusion: the right to regulate access rights, including their transference;
- Alienation: the right to sell or lease either or both management and exclusions rights.

These rights are negotiated by resource users and determined by the rules they choose to create, and not by the characteristics of the resource (Gibbs & Bromley 1989). This distinction between rights and rules is clarified by considering that "rights are the product of rules", in which "rights refer to particular actions that are authorized" and "rules refer to the prescriptions that create authorizations" (Schlager & Ostrom 1992). The rights of access and of withdrawal are essentially operational, not affecting the nature of the CPR regime. This is because individuals holding either of these rights are not entitled to participate in decision-making associated with the three other collective-action rights.

CPR regimes, like other property regimes, often present different bundles of these property rights. Some actors may have the right to access a property but not to withdraw resources from it; others may access and withdraw resource units but may not have the right to manage it; some may have the right to decide on access rights, but cannot transfer their own rights; and finally some may have alienation rights, which imply enjoyment of all the other rights (Schlager & Ostrom 1992). By organizing these rights in different bundles, different types of property-rights holders can be differentiated[10]:

[10] These rights do not relate directly to the type of property regime. In other words, CPRs can be subjected to open access, private property, communal property or state property but they are not necessarily associated with any of these property regimes. While in an open access regime property rights are not well-defined, in the other three types they lie respectively with an individual (or an organized group of individuals, like a corporation), with a recognizable group of individuals, or with the state (Feeny *et al.* 1990).

Table 4 – Types of property-rights holders

	Authorized entrant	Authorized user	Claimant	Proprietor	Owner
Access	X	X	X	X	X
Withdrawal		X	X	X	X
Management			X	X	X
Exclusion				X	X
Alienation					X

(Adapted from Schlager & Ostrom, 1992)

Actors with different entitlements need not all be individuals from local communities. Individuals and companies may have full access and withdrawal rights, and limited management rights, while the State may hold the rights of exclusion and alienation, as owner of the resource (Sandberg 2007).

The success of the allocation of rights depends on the characteristics of the rules that generate them. Rules that are simple and easy to understand by resource users, and that require an almost effortless apprehension by outsiders, are more likely to be complied with. This implies that rules require recognition not only by the users allowed to appropriate the resource, but also by individuals and communities that are not a part of the common property regime. Because rules governing CPRs are often informal, recognition by government authority may be necessary to legitimize their existence and sustain their success (Lino Grima & Berkes 1989). Rules governing MPAs are considered simpler in the case of marine reserves (i.e., no-take areas) than in multiple use MPAs, and consequently easier to enforce.

The rules devised to govern a given CPR situation are more likely to match the characteristics of the resource if they are defined at the local level. In particular, rules should reflect the characteristics of the resource at stake, as these prescriptions try to deal with the different problems a resource system poses to its users (Ostrom 1990). This speaks to the necessity of involving local users in the management of the resources upon which they depend. It also implies that external intervention in the management of CPRs cannot ignore local knowledge and informal rules already in place, especially as these can contribute both to resource management and environmental conservation (Cinner & Aswani 2007).

Besides being simple and devised at the local level, rules that have lower costs of enforcement are more likely to contribute to the success of the CPR regimes. Enforcement is needed to discourage those inclined to violate rules and to ensure

compliers that they are not easily deceived, that is, that they are not the only ones complying (Ostrom 1990). Low enforcement costs result directly from the rules devised to regulate the use of the resource. For example, during appropriation of the resource, individuals that have the greatest incentive to cheat may be placed close to those who will enjoy greater benefits if free-riding is deterred. A related contribution to reduce enforcement costs is the noticeability of free-riders, which is determined partially by the small size of the resource and of the user group, as well as by the overlap between the location of the two (Baland & Platteau 1996). As enforcement in common property regimes is not externally provided, the role of monitors should not be underestimated. These may be users that are assigned this particular role, or may be just an implicit responsibility of all users, which is quite common in community-based MPAs (Christie et al. 2002; Cinner et al. 2009). Importantly, monitors do have incentives to ensure compliance among their peers, such as prestige and even side benefits (Ostrom 1990).

When enforcement results in the identification of illicit activities, perpetrators will face sanctions. Sanctions that are gradual are more effective than sanctions that are not proportional to the gravity of the offense and that do not take into account special circumstances (Ostrom 1990). The importance of gradual sanctions is illustrated by situations where information is imperfect, where penalties can be wrongly imposed on someone who has not broken any rule; when information is perfect, and there is certainty about the offense, graduated sanctions are nevertheless adequate as these imply greater penalties to serious and repetitive offenders, and smaller penalties to one-time and minor offenders (Baland & Platteau 1996). Penalties may involve apprehension of illicitly harvested resource units, payment of fines, suspension of rights of use of the resource, and in more serious cases even expulsion from the community (McKean 1992). In addition to sanctions, compliance with MPA rules can be promoted with the appropriate incentives, such as skills training, alternative employment opportunities and environmental education (Mascia 1999).

Violations of the rules agreed by all can lead to conflicts. These may result from divergent interpretations of how the rules are to be implemented, leading to different understandings of each user's rights and duties and ultimately to some users perceiving other user's actions as free-riding (Ostrom 1990). Compounding this with the evolutionary and adaptive nature of common property regimes, a low-cost conflict resolution mechanism is therefore essential to ensure the continuation of the regime.

Conflict resolution mechanisms may be supplemented with warnings being issued to avoid rule-breaking and conflict situations (Baland & Platteau 1996). In a coastal management context, conflict resolution mechanisms are essential to the maintenance of governance arrangements, as potentially conflicting uses and interests are paramount to coastal zones (Ehler 2003; Lane 2006). In the particular case of MPAs, lack of impartial and representative conflict resolution mechanisms has been identified as the most disturbing aspect contributing to their social failure (Christie 2004).

As mentioned above, compliance with institutional arrangements of a common property regime can be monitored and enforced by some or all users. Because monitors are simultaneously resource users, ensuring that there is no foul play in monitoring activities necessitates mechanisms that ensure monitors are held accountable for their monitoring and enforcement actions. For example, records can be kept by monitors detailing the circumstances and reasons for applying penalties to users, and such form of bookkeeping should be available to the group members (Baland & Platteau 1996). Even when monitors are not resource users, if they act according to their own interests and not those of the MPA where they work, they can easily jeopardize its marine conservation role (Dalby & Sorensen 2002).

2.2.5.5 Relationship between Resource System and Institutional Arrangements

Having examined different institutional arrangements contributing to the emergence of common property regimes for the governance of common pool resources, it is appropriate now to address the relationship between rules governing resource appropriation and provision, and the resource system characteristics. Appropriation rules include those determining restrictions on time, place, resource units and technologies employed in the harvest of the resource, while provision rules pertain the supply of material, labor and money to maintain resource production (Ostrom 1990). Both sets of rules contribute to the sustainable management of the resource system if they strike a balance between the provision and extraction of the resource, and do not ignore natural replacement rates. For example, fishermen that have been successful in crafting and maintaining common property regimes to govern their activities have usually done so by creating rules that do not impose catch limits, but instead create restrictions on gears and on the duration and location of harvest. This seems to be a result of the high enforcement costs associated with monitoring catches, when compared with those of enforcing the use of gear (Sutinen

& Andersen 1985). High information costs associated with knowing the size of the resource system and with determining the optimal harvesting level may also explain such collective choice. Though the match between such rules and resource characteristics is hard to observe, it has been found to have the strongest association with the success of community forest management (Pagdee et al. 2006). MPA regulations are essentially intended to match resource use to the regeneration of resources, particularly in multiple use MPAs. However, such knowledge is not easy to obtain, and consequently MPA management should be adaptive, that is, "periodically reviewed and revised as dictated by the results of monitoring" (Kelleher 1999).

2.2.5.6 External Environment

The focus of CPR theory on internal factors, such as community, has contributed to the absence of analyses of the role of markets and the state in changing common property regimes (McCay & Jentoft 1998). The studies of Wade (1989), Ostrom (1990) and Balland and Platteau (1996) do not escape this criticism (Agrawal 2002). While they provide limited elaborations on how market integration and state intervention may jeopardize resource sustainability, none of these three studies considers the impact of demography (Agrawal 2001). Other scholars have increased the scope of CPR theory by considering contextual factors – market, State and technology – in their analysis of the conditions enabling successful common property regimes (Agrawal 2002; Husain & Bhattacharya 2004; Klooster 2000; McCay & Jentoft 1998; Meinzen-Dick et al. 2002; Singleton 1999). Such studies have shown that Hardin's "tragedy of the commons" often results from external influences and not necessarily from flaws in the common property system itself or the community governing it (Berkes 1989b).

Technology determines our ability to influence and adapt to environmental conditions. In the case of common property arrangements for the management of common pool resources, as in other situations in general, technology can have both positive and negative effects, depending on how it changes the ration between costs and benefits associated with a CPR institution. Low-cost technology that permits the users group to exclude non-users will reduce monitoring and enforcement costs, increasing the group's utility (Kerr 2007; Wade 1987). For example, fencing a field under a common

property regime allows the group to exclude non-users from using it to feed their cattle.[11] In other situations, technological developments may pose a threat to the sustainability of the resource. When technologies improve appropriation efficiency, they may contribute to the adoption of extraction levels that go beyond natural replacement rates. A modal example is that of fisheries. This sector has observed dramatic changes in technological capacity that are in part responsible for more than 75% of world fish stocks, for which information is available, being fully exploited or overexploited and for the collapse of local common property institutions that regulated coastal fishing activities in small communities (Baland & Platteau 1996; Berkes 1985; FAO 2007b; Maguire et al. 2006; Pauly et al. 2002).

Deleterious technological developments such as those abundantly described in the fisheries sector have taken place rather quickly. Local common property institutions regulating inshore fisheries have often not been able to adapt their rules and rights structures to conform to changes in their environment. Thus, adaptation of the CPR regime to new technological developments may not be possible within a short period of time. Users require time to determine the consequences of technology on their institutions, and to adjust their allocation and distribution. Yet, and in the case of MPAs, technological change can be beneficial. For example, vessel monitoring systems are crucial in monitoring fishing activities in MPAs that protect deep-sea habitats (Davies et al. 2007).

Markets, like technologies, may also have a negative impact on existing common property regimes. For example, road construction may give access to trade markets for harvested resource units. This may provide a strong incentive to increase resource appropriation beyond natural replacement levels, and lead to congestion and even depletion of the resource (Agrawal 2002). By altering the drivers behind individual subsistence resource appropriation, namely by raising the monetary value of resource units, market integration can diminish the compliance pull of local traditional authorities (Ruddle 1993). Markets can also undermine common property regimes through the promotion of specialization of its members. Common property regimes associated with inshore fisheries often rely on rotation schemes. Rotation schemes are aimed at ensuring a

[11] Contrasting effects of fencing with barbed wire have been widely reported. Barbed wire has played a significant role in enclosing the commons in different parts of the world, leading effectively to their privatization (Ostrom 2000a; Tucker 2008).

fair distribution of costs and benefits among all users, as different fishing locations have different levels of resource units at different periods in time. A non-intended but useful consequence of rotation schemes is preventing specialization of users. Market articulation contributes to specialization, sparing resource users the need to travel to the different locations made available to them through the common property regime (Agrawal 2002). As with the introduction of new technologies, market articulation may be less harmful on common property regimes if it happens at a pace that allows for adaptations in rules and rights to take place.

Before proceeding to examine the consequences of State action on commons institutions, it is appropriate to consider the joint action of technologies and markets on common property regimes. For analytical purposes, these two aspects were considered separately, but in reality they often operate jointly. Consider the case of sequential exploitation of fisheries (Lino Grima & Berkes 1989): a valuable species under a common property regime is appropriated from easily accessible areas; high market prices induce the entry of non-owners, usually with more efficient fishing gears and no restrictions on their activities; the common property institution is thus challenged, with exploitation levels leading to congestion and maybe even depletion of the resource; outsiders eventually shift to less valuable species in less accessible areas, with locals being left with depleted stocks and often unable to explore farther locations.

The third form of external influences on common property regimes arises from state actions. State intervention has been frequently harmful to local management institutions governing the commons. Often lacking the knowledge about, or even purposely ignoring, informal management systems, many states and donor agencies have advanced policies reclaiming the commons they perceived to be unmanaged (Bromley & Cernea 1989). Many of such interventions have been part of a broader strategy to build young states, traditionally after long periods of colonization (Bromley & Chapagain 1984). However, they have regularly undermined traditional communal controls, being often unable to replace these controls with an effective alternative system, be it public or private property (Berkes 1989a). An example of how undermining local authority can result in the deterioration of the marine environment is the decline of customary marine tenure in the Pacific (Johannes 1978).

Yet, state intervention is not always detrimental to commons institutions. On the contrary, it is often necessary to deal with resource degradation and to enable recovery of

irrigation systems from extreme environmental events, such as earthquakes and landslides (Baker 2001). The conditions under which states may intervene can dictate the success or failure of common property regimes. Common property regimes are rarely formalized and recognized by official authorities, as they tend to parallel existing official regulations or even replace them when these are either absent or not enforced. While formal recognition by local and central governmental authorities may not be an essential condition for their success, it can shield commons institutions and legitimize enforcement. Lack of formal recognition may in some cases prevent them from participating into regional management initiatives, or even jeopardize their existence (Berkes 2006). That is the case of some fisheries in India under community-based arrangements, which appear to have emerged as a consequence of recent changes in markets and legislation, and that have not been able to ensure exclusion of outsiders due to lack of state recognition (Lobe & Berkes 2004). While this shows that active state intervention is sometimes necessary to maintain local institutions, a passive but benign attitude may also bring a positive contribution to their survival. Thus, when central authorities refrain from undermining local authorities associated with the governance of the commons, they are indeed contributing to their success (Ostrom 1990). In the case of community-based MPAs, legal recognition may be an essential step for their wider societal acceptance (Aswani et al. 2005).

Central authorities may also supply some functions to local institutions governing the commons, such as sanctioning. Sanctioning by external institutions may be necessary when the group of users is too large to ensure proper enforcement (Baland & Platteau 1996). In larger groups, users tend not to know all the users, reducing the compliance pull of moral norms that arise from persistent personal interactions. For example, in mangrove community-based protected areas in Ecuador, enforcement is a task of local authorities, while involved communities are responsible for the implementation of a management plan.

In some situations, where agreement on the initial distribution of resource units cannot be reached, the State may take the responsibility for side payments. Such situations are often associated with the need to not only manage the resource but to secure its conservation. Side payments are adequate when an equal distribution of appropriation rights may lead the users that were previously more productive to free-ride; they may also benefit resource sustainability by providing alternative sources of income during periods when resources cannot be harvested, thus linking resource management to environmental

conservation (Baland & Platteau 1996). Indeed, successful alternative income generating activities are an important predictor of community-based MPAs' success (Pollnac et al. 2001).

Considering the influence of the central authorities on local common property regimes evokes issues of scale. Complex common property regimes may be organized at various levels, with nested layers of enterprises (Ostrom 1990). This means they can be intertwined with other organizations, like professional associations, local government or central government institutions, being linked to these both horizontally (linked to another organization at the same scale) and vertically (linked to another organization at a different scale). For example, Beach Management Units – i.e., local organizations mandated to co-manage coastal fisheries resources in Kenya – are created and operate through the intervention of distinct organizations such as the Ministry of Fisheries Development, provincial administration, non-governmental organizations, and courts (Cinner et al. 2009). Each organization has a different role at different steps and scales of the BMU framework, implying that changes in rules of one organization affecting the BMU framework require adjustments by all the other organizations. Nestedness thus invokes organizational interdependence in the management of CPRs, possibly reducing transaction and information costs at all levels. This decentralized governance of the commons, in which local institutions benefit from linkages with higher-level entities, can be hypothetically formalized by networks of community-based MPAs that depend on a centralized authority to perform some functions such as sanctioning. Independently of the types of linkages pursued by MPAs, it is widely recognized that they should be linked and integrated within larger management frameworks (Cicin-Sain & Belfiore 2005).

The previous discussion of the conditions that may enable successful common property regimes was occasionally punctuated with brief comments on the implications to MPAs. The following section concentrates in greater detail on the relevance of common pool resource theory not only to MPAs, but also to the study sites in East Africa.

2.2.6 Common Pool Resource Theory and Marine Protected Areas in East Africa

The choice of common pool resource theory to investigate the governance requirements of transboundary networks of MPAs is not accidental. CPR theory and the characteristics

of this study overlap in three different ways that yield the theoretical framework of CPR theory essential to the analysis.

First, the physical conditions that transboundary networks of MPAs will face in each of the two case studies are adequate to the application of CPR theory. In each case study the two states involved share marine resources and habitats across their maritime borders. The coasts of Mozambique and Tanzania are divided by the mouth of the Ruvuma River. This geographical feature may set a physical separation between the coastlines of the two countries. Yet, they still share live marine resources that straddle their common maritime boundary, such as shrimp (FAO 2000). Also, fishers from Mozambique often cross the border to Tanzania to sell their catch in Mtwara, while Tanzanian fishers are known to fish in Mozambican waters, returning to their country to sell their catch (TRANSMAP 2008d). In the southern transboundary site, there is no geographical feature marking the border that divides the coastlines of Mozambique and South Africa, with coastal habitats being shared between the two states. Several fish species and marine mammals are known to straddle the maritime border between the two states. Also, the transboundary coastal zone of both states provides habitat to five different species of sea turtles, among other charismatic species (TRANSMAP 2008a, b). Shared resources and habitats create interdependencies between each set of states. These are further reinforced by cross-border movements of people that appropriate resources on one side of the border and move them to the other side.

The second motivation for the use of common pool resource theory stems from the object of this research – marine protected areas. Marine protected areas are tools for the protection of marine biodiversity. MPAs are characterized by the difficulty of excluding non-users from accessing it and extracting its resources from it, which is generally inherent to the marine environment. MPAs and their networks can then be considered common pool resources, as they are subjected to “bundles of collective entitlement for their constituents which require protection through controls on their use” (Murphree 2002). Another aspect of MPAs reinforces approaching their creation from the angle of common pool resource theory. Though MPAs are essentially ecologically-oriented in their goals, there is abundant evidence showing their creation and management cannot ignore the human dimensions associated with conservation efforts (Christie et al. 2003; Mascia 2003). MPAs can be considered regulators of human behavior as they prescribe behaviors through their rules (FAO 2007a; Jentoft et al. 2007).

One of the human dimensions of MPAs is property, whose rights stem directly from the MPA rules (Mascia & Claus 2009; Naughton-Treves & Sanderson 1995). Given the geographical scope of many MPAs, as well as that of their networks, it is unavoidable that the creation of either of them will interfere with existing property claims, potentially generating conflicts between competing claims. The creation of MPAs introduces new claims through their regulations, leading to a reallocation of rights whereby some users will lose entitlements and others will benefit from new ones (Mascia & Claus 2009). For example, the creation of MPAs can lead to the conversion of a marine area previously subjected to a common property regime into open access or public property, depending on the capacity of the State to enforce regulations (Moeliono 2006). In contrast, a marine area could also be open access and the creation of a MPA could bring it under a common, public or even private property regime. Within this context, the usefulness of CPR theory lies in its typology of pre-MPA bundles of property rights and how these may be affected by MPA creation. CPR theory can also assist in identifying the characteristics of marine resources of conservation significance, and how these are appropriated. For example, (i)mobility of resources to be targeted by conservation measures within MPAs are of particular interest, as they have a strong influence on the governance arrangements aimed at their conservation (Naughton-Treves & Sanderson 1995).

Finally, CPR theory is fundamental to the examination of the governance requirements of transboundary networks of MPAs because it underscores the importance of collective action and cooperative behavior at the local level in managing collectively owned resources. This community-based aspect of common property regimes makes CPR theory appropriate to the study of MPAs in because community-based MPAs are an emerging trend in the region (Francis et al. 2002). This trend is a regional expression of the global shift in protected area governance from “nature fortresses” to sustainable use, in which regulation of use has replaced use exclusion (Murphree 2002). It will be hard for future creation of MPAs to ignore this trend. Common pool resource theory can provide insights into the potential of future MPAs for community-based arrangements, as it stems from an insightful, though not complete, understanding of how common property regimes emerge and are sustained in time. For example, CPR theory postulates that common property regimes tend to be more successful when users have a strong dependence on the resource system. This condition is observable in most coastal communities in the two selected case study areas. CPR theory also proposes that collective action for the

management of common pool resources is likely to be more successful in situations where state control is weak or even absent. Some study areas are generally characterized by weak control of marine resources by the state, of which fisheries are the modal example. CPR theory can thus provide a basis for the evaluation of the possibility of creating community-based MPAs in the two study areas.

In sum, common pool resource theory is adequate to the examination of the governance requirements of transboundary networks of marine protected areas because the marine resources and habitats at stake in the two case studies resemble common pool resources, as they are shared between each set of states. Additionally, the characteristics of MPAs enable their treatment as common pool resources. Finally, common pool resource theory can assist in the assessment of the potential of the two planned transboundary networks of MPAs to encompass community-based MPAs.

2.2.7 Limitations of Common Pool Resource Theory

The application of any theory to investigate a given topic is bounded by the limitations of that same theory. Theories are as good as their explanations of the real world fit empirical observations (Popper 1963). Like most theories, CPR theory has its limitations. Its use necessitates an understanding of such constraints, as conclusions drawn from this study, as well as their policy implications, will be bounded by them.

The most prominent contribution of CPR theory is its explaining of the existence and maintenance of local cooperative arrangements for the governance of common pool resources. The conventional theory of the commons had not been able to explain how users overcome over-appropriation dilemmas, nor when private and public property regimes may be more adequate than communal regimes (Ostrom 2001). The alternative CPR theory described in section 2.2.5 has furthered the understanding of how communities organize to overcome appropriation problems associated with scarce, subtractable and hardly excludable resources. Most importantly, CPR scholars have contributed to a comprehensive, but not exhaustive, list of conditions that facilitate successful communal governance of common pool resources.

However, how these conditions were investigated imposes some limitations on their predictability. Common property regimes are naturally evolving institutions that emerge as a result of a joint need to regulate the appropriation of scarce and valuable

CPRs. They are therefore a product of social adaptation to socio-natural environment, often constituting quite stable institutions that result from processes of trial and error. Their persistence can be considered a measure of their capacity to overcome new collective dilemmas. Unsurprisingly, empirical observations of common property regimes have centered on those institutions that have persisted with varying degrees of success, and sporadically on some that have failed to maintain themselves or even to emerge at all (Lobe & Berkes 2004; Ostrom 1990). As such, the conditions advanced by many researchers thus explain the maintenance of such institutions but do not necessarily explicate their emergence. The evolutionary and adaptive nature of common property regimes thus limits researchers' ability to elicit their origins, adaptation and evolution into their present form (Snidal 1995).

The empirical observation of innumerous such regimes has centered essentially on local CPR systems managed by a small group of users, that is, under conditions particularly favorable to the emergence of successful collective action (Ostrom 1990). More recent studies on CPR theory have tried to explain how larger user groups may actually be a contributing factor to successful CPR regimes. The size of the user group has been generally perceived as a crucial factor in the emergence of successful CPR regimes. Yet, many other variables can affect collective action for the governance of the commons. The large number of variables, though valuable for expanding the explanatory power of CPR theory, poses some obstacles to comprehensive studies of CPR regimes (Agrawal 2002). Firstly, the factors that explain the maintenance of common property regimes are general propositions that have been collected from a variety of studies. A variable that may be important for a fisheries regime may not be so for an irrigation regime. Secondly, if a study is to consider all the 27 variables posited by Agrawal (2002), as well as others referred to in the literature that were not considered, the associated research effort may hardly meet research capacities. This leads to a third difficulty of relying on many factors: relevant variables for a given study may be ignored, while others that in fact do not explain accurately collective action may be erroneously integrated into causal rationales. Fourthly, the various variables, though independent in relation to the outcomes associated with CPR regimes, may be causally connected. In other words, the influence of one given variable over institutional outcomes may be mediated by another variable. Logically, this complicates enormously the detection of causal relationships. Fifthly, complexity in the role of these variables is further increased because some do not

have a linear behavior, producing instead one similar result at high and low values and another at medium values. Therefore, general statements about a few variables cannot be analyzed independently from each other, but instead their effects need to be seen as interactive. In other words, the effect of a variable on the success of CPR regimes may be contingent with other variables, but there is no exact way of knowing how the various variables at play correlate to each other (Agrawal 2002). These complex interdependencies between variables complicate the establishment of causality, reducing their predictability and hindering theoretical generalizations about their effects (Cox 2008).

2.3 Regime Theory

This section introduces the foundations of regime theory. First, the concept of international regimes is explained and its relevance for the study of international cooperation discussed. Then, it follows a depiction of the evolution of regime theory from its initial assumptions to more recent advances. Given their importance to this research, environmental regimes are briefly examined. Taking into account that there are not in place any regimes to regulate cooperation in the creation and management of transboundary networks of MPAs, the factors enabling regime formation are described and explained. Assuming the creation of such regimes, it is very likely that states will create institutions to promote and maintain cooperation in that regard, as decentralized cooperation is difficult to achieve (Koremenos et al. 2001a). The literature on institutional design will then end the theoretical presentation of regime theory, giving place to the examination of its limitations and relevance for the study of transboundary marine conservation.

2.3.1 International Regimes

Historically, the field of international relations has been dedicated to explaining the behavior of States at the international level in relation to affairs of their common interest. Until the 1970s, most studies of international relations had done so by relying on the examination of international law. This legalistic approach to the study of international relations was eventually criticized for ignoring that rules and norms, codified in international law and purporting to be abstract and universal, are in fact a rationalization

or even a mere reflection of the power and interests of states (Hurrell 1993). Reactions in scholarship to this excessive formalism of international law have been responsible for a partial shift in the research focus of international relations to international regimes (Rittberger & Mayer 1993). International regimes are defined as:

> "*a set of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations.*" (Krasner 1982).

Principles are beliefs of facts, causal links and moral; norms are standards of behavior reflected in rights and duties; rules instruct specific actions; and decision-making procedures are related to implementation. Principles and norms constitute the defining core of regimes. Changes in a regime's principles and norms imply changes in the regime itself. In contrast, rules and decision-making procedures do not alter the nature of the regime as long as they do not reflect changes in the principles and norms of a regime (Krasner 1982).

This definition goes beyond the formalism of international law by considering also informal rules. Yet, it is troubled by the question of showing how rules and norms have a "compliance pull" of their own.[12] The compliance pull of regimes would have to be at least partially independent of the power and interests that usually generate them, and would have to be effective even when contrary to states' interests (Hurrell 1993). In other words, regimes strike a balance between reflecting power and interests of states in the absence of a world government and having a restraining effect on states' behavior even when their individual self-interest would lead them to act otherwise (Hurrell 1993). By positing states as self-interested entities seeking to maximize their individual utility, it follows that states will adhere to a particular regime when the liquid benefits accrued by their membership exceed those enjoyed in the *status quo* (Oye 1985). To this consideration may contribute the impact of their new position in relation to other states, whether the discussion of the issue at stake can include other issues, and the shadow of the future, among other aspects (Axelrod & Keohane 1985; Haas 1980). If joining a

[12] International regimes codified in legal agreements have the advantage of increasing the credibility of the commitments between states (Abbott & Smidal 2000). However, they appear to be less abundant than informal regimes. Informal regimes have therefore some advantages over formal ones, such as allowing for greater ambiguity and consequently having a greater potential to facilitate agreements than formal regimes (Lipson 1991).

regime, a state can expect it (i) to provide a framework for liability, (ii) to reduce transaction costs associated with reaching agreements among its members, facilitating future cooperation, and (iii) to improve the quality and quantity of information available on the behavior of states, reducing uncertainty (Keohane 1982). A regime will then facilitate the coordination of actions among states in issues of common interest.

Regimes have been termed “pervasive characteristics of the international system” (Krasner 1982). Yet, this classification is not without criticism. The validity of the regime concept has been argued to be a “fad” obscuring the power relations that produce the rules governing relationships between states (Strange 1982). This and similar criticisms have been refuted by demonstrating that regimes do make a difference in bringing cooperation into the international arena (Boczek 1987; Puchala & Hopkins 1982). A regime matters if its members’ behavior differs from the one they would have in the absence of the regime (Krasner 1982). Thus, members of a regime will expectedly align their actions with the regime’s principles and norms, generating predictability of behavior around a common issue. Regimes are beneficial to their members also by facilitating information exchanges among them. However, while regimes may contribute to reduce information asymmetries among members, they are still faced with information-related problems that can affect interactions between states, namely: moral hazard, occurring when agreements introduce incentives not to cooperate; and deception and irresponsibility, when members ignore that another member has entered into agreements that it does not intend or knowingly cannot fulfill (Keohane 1982). In any of these information-challenged situations regime participants can endure less benefits than they originally expected, and reductions in individual net utility are observed exclusively by regime participants. However, regimes may also impose costs on non-participants, while providing net benefits to their members than costs. Consequently, global utility may actually be decreased if the benefits enjoyed by regime participants do not outweigh the costs imposed on non-members (Keohane 1982).

Regimes provide an environment that facilitates interactions between members that are conducive to reach agreements on jointly desired outcomes, that is, when actors share similar interests. Regimes can also facilitate reaching agreements on jointly unwanted results, or common aversions (Stein 1982). These distinct situations necessitate different solutions: a dilemma of common interests is solved through cooperation, and one of common aversions requires only coordination among actors (Stein 1982).

Cooperation occurs when joint outcomes yield more benefits to the involved actors than decisions that take only self-interest into consideration. This means that a cooperative outcome of the decision-making process is contingent on other actors' decisions (Kratochwil 1993). In contrast, coordination only entails that actors avoid the collectively most undesirable outcome, imposing less restrictions on their individual pursuit of self-interest. The behavior of actors engaged in the avoidance of common aversions needs only to be mutually consistent, or coordinated, and not mutually restrained. Another difference between regimes created to solve cooperation dilemmas and to solve coordination dilemmas is that the former require enforcement and the latter do not (Stein 1982). Enforcement is more easily ensured by an organization assisting in this and other functions, than by the regime members' themselves. Hence, cooperation regimes are more likely to be implemented through organizations than coordination regimes (Stein 1982).

This leads to the importance of distinguishing regimes from organizations. Organizations refer to the bureaucratic and logistic aspects of an institution, such as office, administrative procedures and budget (Young 1982b). A regime may exist without an organization, while organizations are created to serve regimes and other institutions.[13] When regimes require formal organizations for their implementation, their establishment is feasible usually only with a common understanding of the purpose of such organizations (Kratochwil 1993).

As Krasner (1983)'s definition indicated, the emergence of an international regime is generally sparked by a common concern of two or more states in a given issue area. Hence, it is implied that regimes are restricted to a single issue. However, it is often the case that international regimes emerge in connection with two or more related issues. The international regime on the law of the sea is paramount to the congregation of several issues in one single regime, or issue-linkage. Codified in the United Nations Convention on the Law of the Sea (UNCLOS 1982), it covers issues concerning the use of the seabed, freedom of navigation, natural resource conservation and management, marine scientific research, among others. It is also an evolving regime, spawning related regimes in connected issues such as shipping and regionalism in ocean management (Joyner 2000).

[13] This necessitates a second distinction, that between regimes and institutions. Regimes do not need to be institutionalized, being then considered quasi-regimes. Conversely, institutions need not be a regime. An example of such institutions is the United Nations, where being a member of the institution does not prevent independent decision-making (Stein 1982).

But what is the benefit of creating a regime covering more than one issue-area? And what conditions are more susceptible to issue-linkage? Issue-linkage can facilitate the negotiation of agreements in situations where actors' interests are asymmetric (Haas 1980). In contrast, when actors have very strong preferences and the power to maintain them, they are not willing to associate other issues with the one at stake. Issue-linkage therefore provides opportunities to advance negotiations in an original issue-area by integrating its negotiation game with other games related to other issue areas. There are three ways through which issue-linkage can be introduced in negotiations (Haas 1980). Substantive linkage may occur as a result of increased and agreed knowledge that justifies linking related issues together. Actors often will perceive issues to be linked through common causes or common effects, which explains for example all-encompassing environmental policies in the European Union (Liefferink 1996). In tactical linkage, issues need not be connected in any way as the objective for the actor introducing the new issue is simply to gain leverage in negotiations on the original issue. Tactical linkage is typically used by the weaker actors, as in the UNCLOS III negotiations where developing states introduced the issue of strait navigation to ensure the agreement of developed states to the international status of the deep seabed (Haas 1990). Finally, fragmented linkage occurs when actors in a coalition share a common overall goal, but are uncertain about the interconnectedness of the issues at hand and how to achieve the overriding goal. The negotiations of the New International Economic Order depict well this case, with some coherence among the states but lack of agreement on the knowledge base supporting negotiations (Haas 1980). Issue-linkage is a prevalent strategy dependent on knowledge that creates more opportunities for cooperation where many actors interact in different arenas associated with different issues (Haas 1980; McGinnis 1986).

In sum, regimes can be considered as mechanisms that enable both communication and cooperation. Communication among members of a regime allows each participant to increase its understanding of the consequences of an agreement, while cooperation enables members to jointly select a particular agreement from a variety of possibilities (Kydd & Snidal 1993). From this, it is clear that regimes are distinct from agreements. Regimes are thus more than occasional glimpses of cooperation, denoting long-term calculations of interest. Regimes work as "intervening variables standing between basic causal variables (most prominently, power and interests) and outcomes and behavior", facilitating coordination between actors in the international sphere in relation

to a given issue-area (Krasner 1982). However, regimes do not ensure that cooperation will emerge.

When regimes emerge, their characteristics will depend both on specific factors, such as the distribution of power among participating actors, and on context. However, a classification of regimes is more useful if allows the comprehension of their consequences, instead of restricting the study of regimes to their causal factors (Levy et al. 1995). Regimes can be characterized according to their scope, their strength, and the compliance effect they have on participating states (Haas 1993). The scope of a regime concerns the issues it regulates, which may range from the uses and applications of a single substance to all the uses of a shared resource; the strength of the regime is related to how stringent are demands on states to comply with the regime's prescribed behavior (Haas 1993). In terms of compliance, there are usually differences among regime members, usually associated with their individual capacities and the ranking of the issue on their domestic agenda.

The preceding discussion attempted to provide a brief introduction to the concept of international regimes. The following section will complement it by elaborating on the development of regime theory and its consequences to the study of international relations. In particular, it will address particular contributions to scholarship that have increased the comprehensiveness of regime theory.

2.3.2 The Evolution of Regime Theory

2.3.2.1 Basic Assumptions

As mentioned at the outset of the previous discussion, regime theory developed in reaction to legal descriptions of international relations. These were deemed insufficient to explain existing cooperative behavior between states in the absence of strong centralized institutions (Snidal 1996). The concept of international regimes has been found to fit empirical observations of formal and informal cooperative behavior among states (Snidal 1996). Empirical analyses of regimes are informed by three different but complementary assumptions.

The first is that there is not a world government to regulate interactions between interdependent states, and none is likely to emerge (Mayer et al. 1993). Without such an

authority, the relationships between states occur in a state of "anarchy", or, as others have proposed, governance at the international level is exercised without government (Rosenau & Czempiel 1992). It is important to make a distinction between cooperation, "anarchy" and harmony. Cooperation is not the same as harmony: cooperation exists when actors with different interests converge in their actions for their mutual benefit, while harmony implies a perfect alignment of interests among actors (Axelrod & Keohane 1985). Anarchy, on the other hand, should not be understood as chaos or permanent conflict, but instead as the absence of a world government. This however does not preclude the availability of the functions a central authority would perform, such as conflict prevention and unity preservation (Rosenau & Czempiel 1992). Regime theory therefore attempts to explain how states claiming sovereignty but competing for power and influence can cooperate in an anarchic international arena from where a central government, purported to make and enforce rules of behavior, is absent (Hurrell 1993). Cooperation is then a possible situation "beyond anarchy and short of supranational government in a given issue area (Mayer et al. 1993).

The second assumption underlying regime theory is that states are self-interest actors that seek to maximize their individual utility (Hurrell 1993). A corollary of this assumption is that actors in international relations are predominantly, if not exclusively, states. The consequence is the already mentioned suggestion that states will only join a regime if it brings it more liquid benefits than the *status quo* (Oye 1985). The concept of self-interested states also highlights the role of norms and rules in overcoming the assurance problem and in affecting the pay-off structure (Hurrell 1993). In the first case, norms and rules ensure that all participants put a minimum effort into cooperation if they are to enjoy the benefits of their own actions. In the second case, norms and rules impose some limitations on a participant's behavior, limiting their behavioral possibilities, and altering costs and benefits of other participants. In other words, norms and rules make one actor's behavior contingent on other actors' behaviors. This is possible because uncertainty is reduced, communication is facilitated, learning is promoted and knowledge and information are transmitted (Hurrell 1993). Interestingly, and despite being associated with egoistic behavior, self-interest has been suggested to play a role in ocean ethics given the common benefits that all may enjoy from a clean and healthy ocean (Auster et al. 2009).

Finally, the third assumption of regime theory is related to the role of reciprocity (Hurrell 1993). Reciprocity can be defined as:

> "*exchanges of roughly equivalent values in which the actions of each party are contingent on the prior actions of the others in such a way that good is returned for good, and bad for bad*" (Keohane 1986).

Reciprocity can be interpreted in two distinct senses. Specific reciprocity occurs when actors engage in exchanges of the exact same value in pre-determined terms, while in diffuse reciprocity the equivalence between the exchanged items is not as clear, those participating in the exchange may be seen as a group instead of individual actors, and there may not be an agreed sequence for the exchange (Keohane 1986). Despite these differences, both definitions enable trust among actors, and entail two similar ideas, those of contingency and equivalence. One actor's actions are contingent when they are conditioned by other actors' actions; equivalence needs not be absolute correspondence, being this aspect that distinguishes absolute from diffuse reciprocity (Keohane 1986).

2.3.2.2. Advances in Regime Theory

Those three assumptions of regime theory, though essential to its development, do not however explain its evolution. Regime theory has evolved in different directions to be able to better explain the emergence, maintenance and collapse of cooperation at the international level (Levy et al. 1995). Advances in regime theory have been possible by enlarging its scope beyond the state-centered perspective that dominated much of the initial regime studies. Consequently, students of international relations have come to focus their attention on the role of non-state actors in shaping the interests of a state in international negotiations, in particular the role of NGOs (Bas 2000; Haufler 1993). Additionally, the focus of regime theory has been increased by relaxing the assumption of the state as a unitary actor. In particular, regime theory has come to address the influence of domestic politics in regime formation and operation (Zurn 1993).

The issue of domestic politics and its influence on regime formation is not a lesser one, as it had been suggested in the early 1980s (Strange 1982). Domestic politics can alter the utility function that states try to maximize in the international sphere (Kydd & Snidal 1993). Particularly when international regimes require legislative ratification, the

importance and interests of those able to influence a state's position in the regime negotiations cannot be ignored (Kydd & Snidal 1993). This does not mean that domestic politics are capable on their own of determining the outcomes of international negotiations. Instead, it is the interaction between, on one hand, negotiations among states in the international sphere and, on the other hand, each individual state's negotiations within their own domestic arena, which influences the formation of regimes. In other words, the study of regimes cannot ignore "how the domestic politics of several countries became entangled via an international negotiation" (Putnam 1988).

The importance of domestic politics to the formation of regimes is closely linked to the role of non-state actors. Found either at the domestic or the international levels, when not in both, non-state actors have slowly gained prominence in regime scholarship. International regimes are typically created by states, but the domestic implementation of many of the regime rules can easily affect non-state actors, such as corporations operating inside states' jurisdictions and whose behavior the regime seeks to regulate, or NGOs that can contribute towards regime implementation. Non-state actors potentially affected by international regimes will then most likely seek to influence the outcomes of international negotiations by pressuring national officials. These are in turn subjected to the two-level game of international relations, whereby a state negotiates regimes with other states, and then will implement its provisions within their jurisdictions (Young 1995).

Non-state actors can try to influence regimes that may affect their activities or to which they are attentive. They can also create their own regimes, resembling in these activities the performance of states when forming an international regime (Haufler 1993). Non-state actors and state actors are thus related in two different ways when considering the formation and maintenance of international regimes (Haufler 1993). On the one hand, states can create regimes that are partially implemented by non-state actors such as corporations and NGOs. That is the case of the regime to control pollution in the North Sea. Created by the North Sea coastal states, the success of this regime success has depended greatly on the collaboration of industry, agriculture and wastewater treatment companies (Skaerseth 2003). On the other hand, non-state actors can create their own regimes or participate with state actors in similar terms in the formation of new regimes. An example of the latter is the formation of the regime embodied in the Code of Conduct for private companies dedicated to sell pesticides to developing states, which was significantly influenced by both environmental NGOs and industry representatives

(Paarlberg 1993). Of particular importance here is the role of many NGOs who have tried to influence regime formation both domestically and internationally (Princen & Finger 1994). That is the case of NGOs such as Greenpeace, present simultaneously at the national level in a significant number of states, but that are also able to influence international negotiations (Parmentier 1999). The influence of non-state actors can go as far as to be the source of principles and norms upon which new regimes are based. The principle of prior informed consent (PIC) imbedded in the regime regulating trade in hazardous chemicals and pesticides was proposed by NGOs (Paarlberg 1993). Even when not participating directly in the formation of a regime, NGOs can also perform some of its functions, such as monitoring, information collection, and enforcement (Haufler 1993). For example, implementation of PIC within the hazardous chemicals regime and associated Code of Conduct has been ensured by environmental NGOs, which have at times provided the only independent review of implementation success (Victor 1998). Additionally, they may form coalitions within the domestic political system or in the international arena to try to influence regime formation (Haufler 1993). That is the case of NGOs that were very active in promoting the global ban on ivory trade as a solution to the poaching of elephants, which was considered the biggest threat to their survival (Nadelmann 1990). Some caution is needed however in the use of the catch-all term non-governmental organization, as it includes a diversity of organizations that only have in common their existence outside of the sphere of the state (Götz 2008). Non-state actors can also create their own regimes without participation of state actors in the definition of its principles, norms, rules and procedures (Haufler 1993). Private regimes governing the financial and insurance markets are quite common. Similarly, NGOs have created a regime for transboundary conservation between Bolivia and Paraguay, and have also engaged in partnerships with the business actors to provide standards for certification of sustainable fisheries (Budowski et al. 2003; Pattberg 2005). Private regimes established by the private sector contrast with public regimes in that the former emerge in connection with a particular industry sector and the latter are created around specific issue-areas (Haufler 1999).

Regime theory therefore explains not only the international system where a state's actions are often contingent on other states' actions, but also the existence of an international society where states "have established by dialogue and consent common

rules and institutions for the conduct of their relations, and recognize their common interest in maintaining these arrangements" (Buzan 1993).

2.3.3 Environmental Regimes

One particular area of development of regime theory has been in connection with environmental issues (Boczek 1987; Lejano 2006a; Young 1982b, 1994, 2001). In this field, regime theory is concerned with the design of "institutions that serve to order the actions of those interested in the use of various natural resources" (Young 1982b). This is a natural area of development of regimes, given the global interdependencies that many natural resources create among states. However, there are no substantial differences between regimes oriented toward natural resources or environmental governance, and those intended to govern any other aspect of international relations (Young & Osherenko 1993b).

Global interdependencies differ according to the type of resource considered which in turn determines in part the institutional solutions designed to regulate it. International commons may lie entirely or in part outside of national jurisdiction, and governance options to this type of resource may include a world government, national jurisdiction or restricted common property; natural resources may be shared by multiple jurisdictions, requiring cooperation between State actors to negotiate joint arrangements; transboundary externalities may occur when activities in one jurisdiction affect the wellbeing of those in other jurisdictions, and their resolution raises questions about sovereignty in face of external intervention and liability of the jurisdiction from where the effects originate; issues may be linked when environmental decisions or regimes affect other decisions or regimes, and vice-versa (Young 1994).

A case in point of an international environmental regime is that created to control marine pollution in the Mediterranean Sea (Haas 1989). Given that the main source of pollution was found to be terrestrial activities, this regime's scope was enlarged to include integrated coastal zone management as a cornerstone of the environmental policies of Mediterranean states (Frantzi & Lovett 2008). Other prominent regimes include the regulation of whaling, codified in the International Convention for the Regulation of Whaling (1946), and the regime established for the conservation of Antarctica, codified in the Convention on the Conservation of Antarctic Marine Living Resources (1980)

(Young 1989). These and most other environmental regimes are characterized by interactions within the different jurisdictions located in distinct levels of organization at which they operate, or interactions with other regimes (Young 2006).

Despite the abundance of literature on environmental regimes and the growing number of transboundary conservation initiatives, the application of regime theory to the study of transboundary conservation is still very limited. To date, only on a few occasions has regime theory explicitly informed studies of transboundary conservation (Chester 1999; Lejano 2006a; Lejano 2006b; Prideaux 2003). Game theory has also been applied to contrast transboundary protected areas with non-transboundary protected areas (Busch 2008). Besides these few cases, transboundary conservation initiatives have in general been examined from a sometimes wishful perspective that concentrates essentially on the peace building role of transboundary protected areas (Budowski 2003). Much of this literature is also oriented towards providing guidance into transboundary protected area creation and management (Hanks 1997; Mittermeier et al. 2005; Sandwith et al. 2001; van der Linde et al. 2001). In contrast, more critical perspectives have emerged recently, often supported by a political ecology theoretical framework (Duffy 2001, 2005, 2006; Dzingirai 2004; Singh & van Houtum 2002; Spierenburg et al. 2008). In conclusion, the emergence and operation of regimes governing transboundary conservation has yet received limited attention from regime theory scholars.

2.3.4 Factors Enabling Regime Formation

There are three different schools of thought in regime theory, each attributing different importance to the influence of distinct sets of factors over the emergence of regimes (Haas 1993; Young & Osherenko 1993b).

Realists, or structuralists, explain regime formation as a result of power and capabilities, while denying the influence of interests in determining state behavior (Haas 1982). Their basic premise is that regimes are structured by power and reflect its distribution in international society (Young & Osherenko 1993b). Definitions of power in the realist tradition are associated with the material capacity of a state to force other states to do something contrary to their interests (Barnett & Duvall 2005). In the case of environmental issues, power resources include (i) enough control over a resource allowing a state to dominate collective decision-making affecting it, (ii) sufficient

capacity to change the quality of the shared resource, (iii) enough trade control allowing environmental restrictions to seriously affect trading partners, and (iv) a reputation for diplomatic behavior and scientific knowledge (Haas 1993).

In their treatment of power, realists adopt a collective choice model and posit states to be distinct sovereign and rational units seeking to maximize their own individual benefits and minimize their costs in a self-help system (Bas 2000; Young 2001). The role of power in shaping the prospects of cooperation has been explained in terms of a balance of power for more than five centuries (Little 2007). As independent actors aiming at self-preservation, a state aims to prevent other states or coalitions of states from exceeding its individual capabilities. It will then seek to match other states' capabilities by either expanding its own (internal balancing) or by forming alliances (external balancing) (Eilstrup-Sangiovanni 2009). Hence, the formation of a balance of power can enable international cooperation.

While the goal of a state trying to balance power in its relations is to avoid the emergence of a hegemon, the presence of a hegemonic actor does not necessarily preclude cooperation. The theory of hegemonic stability posits that cooperation in the international arena necessitates a dominant state that determines and enforces rules regulating the interactions between states, thus avoiding "anarchy". This theory has been fueled by historical examinations of the dominant importance of certain states in both trade and military capacity, and its explanatory power is associated with very particular conditions that are not always observable (Snidal 1985b). Yet, international cooperation does not necessarily decrease when there is a decrease or even an absence of hegemony (Keohane 1984). This is in part attributable to the nature of hegemony, which can be associated with the power base of the hegemon, or with its control over outcomes (Russett 1985).

In addition to the impact of a balance of power and a hegemon, there are other mechanisms through which power may affect cooperation. Asymmetry of power has for long been understood as a particularly strong constrain to international cooperation. A case in point is that of the North-South relations (Zartman 1985). In other situations, a group of actors with significant power in the issue-area at stake can be particularly active in promoting a regime.

Various hypotheses have been proposed and analyzed regarding the role of power in regime formation (Table 5).

Table 5 – Power-based hypotheses for regime formation

Power-based hypotheses
Regime formation necessitates or is enabled by: • Bipolar distribution of power (balance of power) • Symmetry in distribution of power • The existence of a small group of great powers in the issue area Regime formation may not necessitate or be enabled by: • The presence of a hegemon in the issue-area at stake

Adapted from Young & Osherenko (1993b).

While power cannot be ignored as shaping regime emergence, configurations of power associated with the presence of a hegemon appear to be disconfirmed (Young & Osherenko 1993b). However, this hypothesis shall not be discarded completely. For example, the US has been able to maintain their hegemony in the negotiations of international environmental regimes. Yet, the US has not acted as a hegemon to promote regime formation, but instead to stall it (Giegerich 2006).

Besides their elaborations on the influence of power configurations over regime formation, realists neglect the influence of non-state actors and domestic politics. An important consequence of their assumption of states as unitary and rational actors is that, while regime membership may reshape the incentives that influence their decision-making, it will not affect their identity or alter their goals (Young 2001).

In contrast with realists, *institutionalists*, or neoliberals, see the interests of the state as more influential in explaining regime formation, and posit regimes to enable states to realize their common interests (Hasenclever et al. 1996). Institutionalism is motivated by the conceptualization of regimes as resulting from the interaction of self-interest actors that seek joint gains by coordinating their behavior (Young & Osherenko 1993b). Institutionalists have significantly used game theory to advance their explanations of cooperation, instead of previous realist uses that were more concerned with conflict (Snidal 1985a). In particular, the use of game theory has been instrumental in linking the situational structure facing actors with the institutional design enabling cooperation among them (Mitchell & Keilbach 2001). Different situation structures are posited to have different levels of regime-conduciveness. Generally, there are two types of situations, each with different implications for regime formation: dilemmas of common

interests occur when actors share similar interests but disagree on how to pursue them; dilemmas of common aversions occur when actors do not agree on a desirable outcome but share their desire to avoid a certain outcome (Stein 1982). In a dilemma of common interests, one actor behaving independently will enjoy a better pay-off than if it makes his actions contingent on other actor's. In other words, a situation of equilibrium between two actors is suboptimal for both of them (suboptimal equilibrium) (Martin 1995). Such type of dilemmas is solved by actors collaborating with each other to ensure mutual enforcement. An example of a dilemma of common interests is the "tragedy of the commons", mentioned in section 2.2.3 (Hardin 1968). In the case of dilemmas of common aversions, enforcement is less problematic. An actor will have an incentive to avoid the common aversion because it may improve his payoff, and actors can only have mutual gains if they make mutually consistent decisions. In other words, "states recognize that failure to agree will hurt all, but they frequently have strongly divergent preferences about which cooperative equilibrium to choose" (Martin 1995). Therefore, actors need only to coordinate their actions. It is then not surprising that coordination games are more regime-conducive than collaboration games (Rittberger & Zurn 1991).

Institutionalists refuse the idea of atomist states, arguing instead that they are integrated in the international system and their positions are therefore relational (Bas 2000). Institutionalists thus adopt a social-practice model by conceiving states as multifaceted entities embodying different and often contradictory interests (Young 2001). This multiple character of state actors is also associated with their presence in various bargaining processes concerning distinct issue-areas. In situations of heterogeneity of interests among actors, cooperation may be facilitated in one issue-area by linking it with other issue-areas. Issue-linkage then comes to facilitate integrative bargaining, that is, bargaining that aims at developing mutually beneficial outcomes (Young 1989), or making the pie bigger. Integrative bargaining is often contrasted with distributive bargaining, a negotiation process to distribute limited benefits, or split the pie. However, in real-world situations the differences between the two are often not clear as both processes are highly intertwined (Spangler 2003), as the pie that has been made bigger will eventually be split up.

Another factor affecting the emergence of regimes is the existence of uncertainty regarding the distributional effects of various institutional options on the actor's relative position in the international sphere (Young 1998). Under this "veil of uncertainty", an

actor does not know the consequences of a certain regime to his relative position, and would then prefer institutional arrangements that perceives to be fair (Young 1989). Contrary to general negative perceptions of uncertainty, this "veil of uncertainty" can then be a good thing, in so far as it may, for example, provide an incentive for actors to increase their knowledge base, promoting learning processes in regime formation (Haas & Haas 1995). While this type of institutional uncertainty can promote regime formation, other institutional uncertainties are rather prejudicial to the operation of regimes. Internal uncertainties, behavioral uncertainties and linkage uncertainties often emerge in connection respectively to the internal characteristics of regimes, the behavior of actors in relation to those regimes, and the relation of a regime with other regimes (Young 1998).

That uncertainty can produce benign outcomes is hardly surprising. Collective action is spurred in part by the need to reduce uncertainty and increase predictability of behaviors. Yet, it is interesting that uncertainty can be dealt with by prioritizing fair or equitable outcomes over efficient ones. In other words, regime formation will be successful if agreed outcomes are equitable, even if at the loss of some efficiency (Young & Osherenko 1993b).

Proposing salient solutions to specific problems can also facilitate regime formation. Salient solutions are simple prescriptions that often help to break through stalled negotiations, and that should be conveyed by their proponents in a straightforward manner to policy-makers (Young & Osherenko 1993b).

Solutions to specific problems that regimes propose to solve can also be accelerated by perceived or real external crisis or shocks (Young & Osherenko 1993b). For example, reclassification of the African elephant as "no trade allowed" was propelled by an evident crisis in its supposedly controlled trade, which was clearly out of control and leading to drastic reductions in populations (Sand 2001).

The study of possible determinants of regime formation has also allowed understanding which factors may not be necessary for regime formation, or that appear not to influence it at all (Table 6).

Table 6 – Interest-based hypotheses for regime formation

Interest-based hypotheses
Regime formation necessitates or is enabled by: • Individual leadership: structural, entrepreneurial, and intellectual leadership (Young 1991) • Equitable, and not merely efficient, institutional options • Salient solutions

- Compliance mechanisms that are regarded as clear-cut and effective
- Integrative bargaining
- A veil of uncertainty
- Exogenous shocks or crises

Regime formation may not necessitate or be enabled by:

- Policy priority status of the issue
- Willingness to set aside narrow national interests in favor of the common good
- Concentrating on scientific and technical considerations, as opposed to political issues
- Greater role of negotiators with scientific or technical competence
- Highly technical character of the issues at stake
- Participation of all relevant parties

Adapted from Young & Osherenko (1993b).

The factors that appear to contribute to the emergence of regimes elicit another feature of institutionalism. Institutionalists recognize that regime implementation is often mediated by states, which seek to regulate the behavior of non-state actors in a defined issue-area. Conversely, state interests are susceptible to the influence of non-state actors (Haufler 1993). This bridging role of the state highlights that regime implementation is a two-step process, requiring first membership from the state and then implementation at the national level. Implicit is then the role of domestic politics, which institutionalists have integrated in game theory by constructing two-level games: "domestic groups pursue their interests by pressuring the government to adopt favorable policies" and "at the international level, national governments seek to maximize their own ability to satisfy domestic pressures" (Putnam 1988). However, explaining regime formation on the basis of domestic sources creates two problems. On the one hand, the independent (domestic politics) and dependent (state behavior) variables are located on different levels of analysis, and on the other hand investigating the domestic sources of state behavior impose severe information costs on the researcher (Zurn 1993). This latter problem can be solved by concentrating exclusively on those states in the issue area who play a prominent role in the process of institution-building (prominent states), and also on the domestic actors that are most active in influencing state's interests (prominent domestic actors).

Cognitivism criticizes realism and institutionalism for ignoring the "pervasive ambiguity of reality" (Mayer et al. 1993). Cognitivists go beyond power structures and interests to focus on factors such as perception and knowledge, which they propose to also explain regime formation (Young & Osherenko 1993b). They posit that knowledge, values and perception of the importance and consequences of the issues at stake, as well as the options available to solve them, contribute to shape states' interests (Haas 1992). Of course, knowledge can also be considered a form of power, indirectly influencing

regime formation (Young & Osherenko 1993b). Still, cognitive explanations of regime formation are concerned with how states' interests are generated by highlighting the role of knowledge (Hasenclever et al. 1996).

While knowledge is determinant for states to have a basis for their decisions on how to act on a certain issue, states will first need to have some consensus of the nature and scope of the problem at hand before they can proceed to consider possible solutions (Hasenclever et al. 1996; Hopkins 1992; Jönsson 1993). Such a convergence of ideas would concern the causes of the problem and a range of potential responses to it. The need for a scientific consensus is especially visible in environmental and natural resource regimes, which are very dependent on science and on changing values regarding human-environment interactions (Young & Osherenko 1993b). For example, the recognition that existing management approaches and institutions were not dealing adequately with transboundary wildlife problems was the main driver for the emergence of transboundary natural resources management, influencing the emergence of regimes for transboundary conservation such as the one governing transboundary wildlife management between Canada and the US (Grant & Quinn 2007).

The importance of such a scientific consensus is highlighted by the interdependence states are constantly faced with. This increases the uncertainty of their causal relationships in their interactions. Knowledge therefore assumes a function of reducing uncertainty. This notion of uncertainty as precluding a full understanding of the origins and consequences of an issue, as well as its linkages to other issues, is distinct from institutionalists' notions of uncertainty. In the latter case, uncertainty is associated with the lack of information about other actors' behavior and interests (Hasenclever et al. 1996).

A scientific consensus about the problem, causal relations, and possible solutions can emerge through the existence of an epistemic community, that is, "a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area" (Haas 1992). Members of this professional network share a common understanding of the problem and possible solutions, and are able to communicate it efficiently to policy-makers (Young & Osherenko 1993a). Because it is often the case that government officials belong to epistemic communities, this form of organization bridges the divide between international and domestic politics. Such networks are capable not only of

promoting their views but also of precluding other views from gaining prominence (Adler & Haas 1992).

While scientific consensus and epistemic communities may facilitate regime emergence, they can also contribute to overcome conflicts that may arise in the negotiation process. Dissensual conflicts arise when actors disagree on what is individually and collectively desirable, while consensual conflicts occur when values and means are agreed upon but actors disagree on how to divide a scarce good (Rittberger & Zurn 1991). Dissensual conflicts can be further divided into value conflicts and conflicts about means. In the former, actors purport to achieve irreconcilable goals, and in the latter they seek to achieve common goals but disagree on the means to reach them. Consensual conflicts can concern absolutely valued goods, such as food, and relatively valued goods, such as military capacity. Each of these conflicts vary in their capacity to stall regime formation (Rittberger & Zurn 1991):

Table 7 – Typology of conflicts

Type of conflict	Object of contention	Regime conduciveness
Dissensual conflict	Values	Very low
	Means	Medium
Consensual conflict	Absolutely valued goods	High
	Relatively valued goods	Low

Adapted from Rittberger & Zurn (1991)

The influence of values and knowledge in regime formation is indisputable. However, scientific convergence and epistemic communities appear not to be always necessary or even determinant for regime emergence (Table 8) (Young & Osherenko 1993b).

Table 8 – Knowledge-based hypotheses for regime formation

Knowledge-based hypotheses
Regime formation necessitates or is enabled by: • Values/ideas that matter • Scientific convergence on the causal relations and appropriate responses to the issue at stake • Presence of epistemic communities (Haas 1992)

Adapted from Young & Osherenko (1993b).

A finally set of factors that contribute to regime formation can be grouped under the general heading of *contextual factors*. These pertain "national and world circumstances and events seemingly unrelated to the issue area under consideration [that] play a major role in determining if and when international cooperation to address a particular problem or issue area occurs and in shaping the content of any regime that

forms" by providing windows of opportunity for regime formation (Young & Osherenko 1993b). These contextual factors may include shifts in values and ideas, new political trends, or simply specific events such as changes in political appointees. For example, transboundary marine conservation currently represents a paradigm shift, which has been motivated by the physical continuity of the marine environment, the global impact of human activities, and the recognition that borderless ecosystems require borderless protection.

The three schools of thought in regime theory advocate the primacy of a specific set of factors in explaining the emergence of international regimes. While these are often approached separately by scholars, they are not necessarily incompatible. In fact, considering the three sets of factors simultaneously may yield greater predictability to the analysis (Efinger et al. 1993; Young & Osherenko 1993b). Regime formation can then be explained by analyzing four sets of factors surrounding possible cooperation between states in a given issue area (Figure 3).

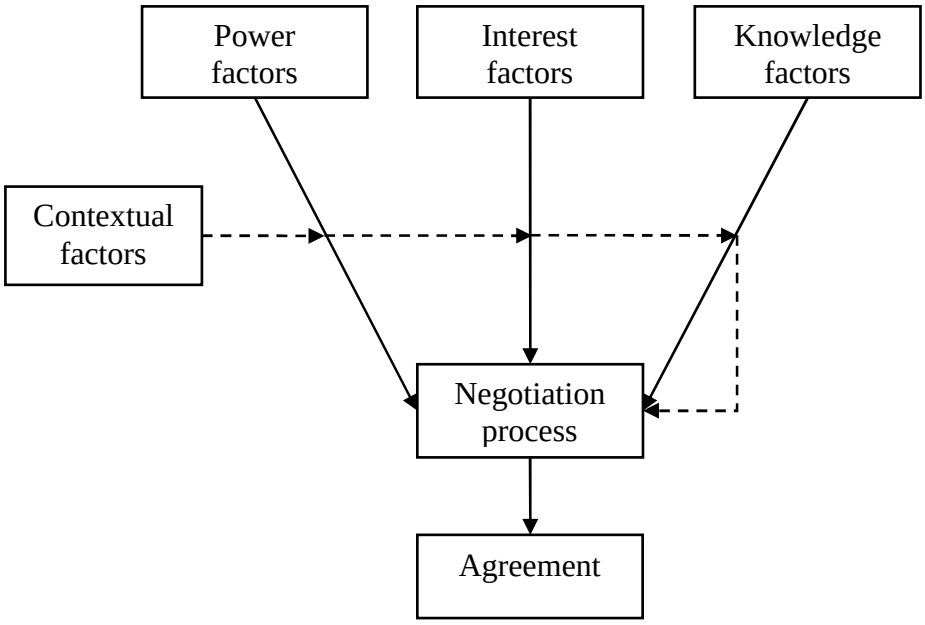

Figure 3 – Regime formation

Adapted from Young & Osherenko (1993b)

Each factor does not operate in isolation from the rest and interactions are likely to occur. These can adopt two forms: substitution effects and interaction effects (Young & Osherenko 1993b). A substitution effect exists when the confirmation of one hypothesis disconfirms others. For example, if the presence of a hegemon is confirmed to influence regime formation, a symmetrical distribution of power is immediately discarded as a

viable explanation. This implies that there would be “tracks” fro regime formation, with specific variables playing a determinant role in each of them. Interaction effects, in contrast, do not preclude the confirmation of one hypothesis at the expenses of another. An interaction may occur when one factor can only be observed after a previous one is confirmed. This causal link interaction is exemplified by the possibility of integrative bargaining being only possible after actors’ interests have been shaped by an epistemic community (Mayer et al. 1993). An interaction effect may not always depict a causal relationship between factors. Instead, these may operate simultaneously to produce a synergistic effect. For example, the interplay between structural and entrepreneurial leadership has contributed to the agreement codified in the Montreal Protocol (Young & Osherenko 1993b).

Multivariate models of regime analysis have caught the attention of various students of regime theory (Efinger et al. 1993; Young & Osherenko 1993a, b; Zurn 1998). Multivariate analysis holds the promise of a greater explanatory power of the determinants of regime formation by considering the influence of a larger set of factors, instead of narrowly focusing on a single factor. This approach may help eliciting significant conditions under which regimes are more likely to emerge. However, because it is applied only *ex post*, using its findings *ex ante* may reduce its predictability, but necessarily its explanatory power. For example, one may be able to explain how observed conditions may affect the likelihood of a state to present a proposal for regulating activities in an issue area (regime initiation), to behave unilaterally in refusing the need for international management of the issue at stake (i.e., regime prevention), or even to show opposition to the most version of the regime without trying to change it or withdrawing from the discussions (Zurn 1993). However, while it would be possible to pinpoint which of these behaviors are more likely, no certainty can be attached to these options. Therefore, and while the behavior of states and other actors in regime negotiation cannot be predicted by this approach, its explanatory power is still significant to allow an analysis of the potential consequences of current conditions on the future emergence of a regime, providing an input into the design of institutions for the regulation of an agreed regime.

2.3.5 Institutional Design

Earlier scholarship in regime theory was concerned with showing under which conditions do regimes matter. Later, it proceeded to analyze how regimes are formed, and what factors determine their persistence, change, and decay. More recently, scholars of international relations have taken a step forward by assuming that regimes are needed, and have focused instead in studying their institutional features and how they should be designed to produce desired outcomes (Koremenos et al. 2001a; Wendt 2001). Institutions such as regimes are important features of international relations. Their importance derives from their ability to facilitate cooperation by embodying principles, norms, rules and decision-making processes (Axelrod & Keohane 1985). Moving from studying the determinants of regime formation to focus on their adequacy raises concerns about how their design can best tackle the problem they were meant to solve.

There is a great variation in how regimes are organized. Different regimes bring together different actors with different interests in the resolution of different problems. In other words, states vary in their willingness to produce and adhere to a regime and in their incentives to defect from it (Mitchell & Keilbach 2001). It is thus not surprising that a regime's components vary with the nature of the problem at hand. Regimes as institutions will then vary along five dimensions (Koremenos et al. 2001b): (i) membership rules, concerning who is included and excluded; (ii) scope of issue(s) covered; (iii) centralization of tasks, or how are tasks such as information dissemination, bargaining reduction and minimization of transaction costs divided between the institution and its members; (iv) control, or rules for controlling the institution, such as decision-making processes and the *loci* of institutional authority; and (v) flexibility of arrangements, so that changing circumstances can be accommodated.

Membership of a regime defines who benefits from an institution and pays its costs (Koremenos et al. 2001a). Regime membership can be global or can be more restricted, depending on the scope of the issue in question and on the uncertainty of states' preferences. For example, NATO membership has generated heated discussions that try to find a balance between its enlargement and Russia's sensitivity (Kydd 2001). A regime's membership can be expanded not only to ensure all states associated with an issue participate in dealing with it, but also to accommodate states that otherwise would undermine regime functionality. Additionally, a regime may not be restricted to states, and can include non-state actors such as NGOs.

A regime may tackle one or more issues that may deal with very specific problems, such as the control of a substance, or may be more general, such as the control of all the activities associated with a shared resource. Regime scope will then vary between these two extremes. The number of issues covered by a regime may depend too on how these are linked, or on the need to link them despite the absence of a cognitive relationship between them.

Regimes may have different functions, reflected in how its tasks are centralized. A regime may operate only as a consultation forum, or functions such as enforcement, reduction of transaction costs and bargaining may be centralized in a focal authority. Centralization in international cooperation may be contentious as it interferes with state sovereignty. Regime members may not be willing to relinquish power in some regime functions, generating a more decentralized regime. Centralizing information exchange may be the least contested form of centralization. Other functions, such as enforcement, bargaining and dispute resolution, are also prone to centralization, as exemplified by the EU. Centralization encompasses not only which tasks are centralized but also how they are centralized (Duffield 2003). The focal authority of a regime may then be a supra-national body such as the EU, a body where all regime members are represented as the Conference of the Parties of the generality of international treaties, or be restricted to just a few regime members such as the UN Security Council.

Centralization is distinguished from regime control, in that both are usually independent. Still, centralization can imply some reduction in control over certain tasks such as enforcement. Nevertheless, control over a regime's decision-making procedures is dependent on decision-making rules that determine voting weight, financial sustainability of the institution, transparency, etc. Greater control can also be used to deal with uncertainty. For example, states involved in the aviation market have retained significant control over highly uncertain aspects of the market, such as traffic flows and pricing (Richards 2001).

Finally, flexibility of a regime refers to its capacity to adapt to changing conditions. Flexibility may take two forms: adaptive flexibility allows regime members to maintain their institutional arrangements while dealing with external shocks through, for example, escape clauses (Rosendorff & Milner 2001); transformative flexibility allows change in and from within the regime, through clauses determining renegotiation of a regime after a certain period of time (Koremenos et al. 2001a). Flexibility is then a

regime feature that allows actors to deal with uncertainty, and is therefore dependent on the knowledge base on which a regime is built.

These five institutional dimensions of regimes are not completely independent from each other, as institutions are more the result of their interaction than from simple grouping them (Koremenos et al. 2001a). As discussed before in relation to the determinants of regime formation, institutional dimensions will interact with each other and produce different effects than those each dimension would produce on its own. For example, it is likely that a regime covering a larger number of issues with a wide scope will have a larger membership than a regime dealing only with a very specific issue.

But how can variation in regimes be explained? Rational approaches have had merit in their ability to explain the emergence and maintenance of international institutions. However, because regimes are the product of power, interests, knowledge and context (Young & Osherenko 1993b), institutional design should be examined within a framework that reflects the factors that explain cooperation (Koremenos et al. 2001a). It is then in power, interests, knowledge and context that clues for regime design should be sought (Figure 4), given the limitations of a purely rational approach (Duffield 2003).

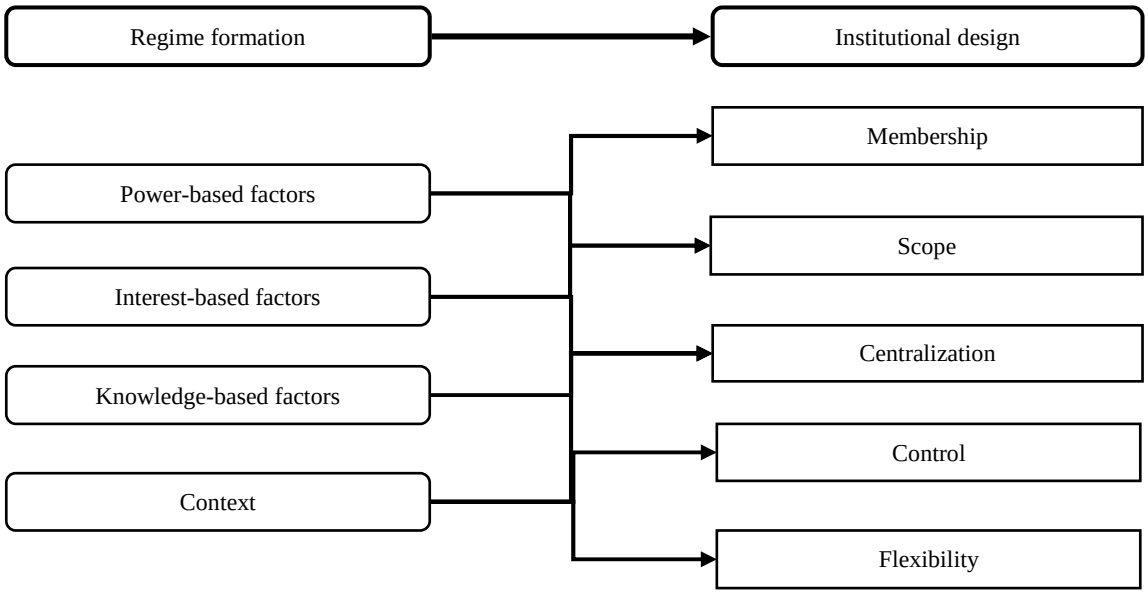

Figure 4 – Regime formation and institutional design

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and inconsequent events (Martin & Simmons 1998). On the contrary, the focus of this research, while mainly preoccupied with the potential for regime formation and institutional design, does not exclude the interest in the consequences of institutions.

After all, it is because institutions have consequences that regimes are studied in the first place.

2.3.6 Regime Theory and Transboundary Networks of Marine Protected Areas

The exposition of regime theory that preceded this section already sheds some light on the choice of regime theory to study the potential establishment of transboundary networks of marine protected areas. Yet, a more precise clarification of its role in this study seems appropriate. This explanation revolves around the match between regime theory and the potentially observable social phenomena that are posited to precede the institutionalization of transboundary marine conservation initiatives.

In the two transboundary regions here considered, there is yet not a complete regime that can prescribe behavior for the creation, establishment, and management of transboundary networks of marine protected areas. The 1985 Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (UNEP 1985a)[14] was created under the Regional Seas Program to enable cooperation and coordination of actions, as well as to facilitate information exchange concerning the marine and coastal environment of East African states. While it includes a Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region that addresses also the creation and management of marine protected areas, the framework provided by this convention does not provide for the establishment of networks of MPAs, transboundary MPAs or transboundary networks of MPAs (UNEP 1985b). . However, most states in the region do have a duty to protect and conserve the marine environment, and to cooperate for that same end, which emanates from their commitments made through the Nairobi Convention,[15] the Convention on Biological

[14] The Amended Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean and a new Protocol for the Protection of the Marine and Coastal Environment of the Western Indian Ocean from Land-Based Sources and Activities were adopted on 31 March 2010. None of these instruments has yet been ratified.

[15] In accordance with Article 10, "The Contracting Parties shall, individually or *jointly*, take all appropriate measures to protect and preserve rare or fragile ecosystems as well as rare, depleted, threatened or endangered species of wild fauna and flora and their habitats in the Convention area. To this end the Contracting Parties shall, in areas under their jurisdiction, establish protected areas, such as parks and reserves, and shall regulate and, where required and subject to the rules of international law, prohibit an activity likely to have adverse effects on the species, ecosystems or biological processes that such areas are established to protect. The establishment of such areas shall not affect the rights of other Contracting Parties and third States and in particular other legitimate uses of the sea." (emphasis added)

Diversity[16] and the United Nations Convention on the Law of the Sea.[17] Hence, there are principles and norms constituting the core of a regime for cooperation in marine conservation. This cooperation can be implemented through sets of rules such as transboundary MPAs and transboundary networks of MPAs. However, decision-making procedures for this end are lacking, and consequently the regime is insufficient. At least in part, it is possible to examine the motivations for cooperation between states on the basis of international agreements between them on the topic of transboundary marine conservation. However, international legal commitments do not inform sufficiently of the motivations, nor at all of the deterrents, to cooperate. Alternatively, regime theory can complement international legal commitments in illuminating how the existing conditions in each study area may affect the emergence of such a regime.

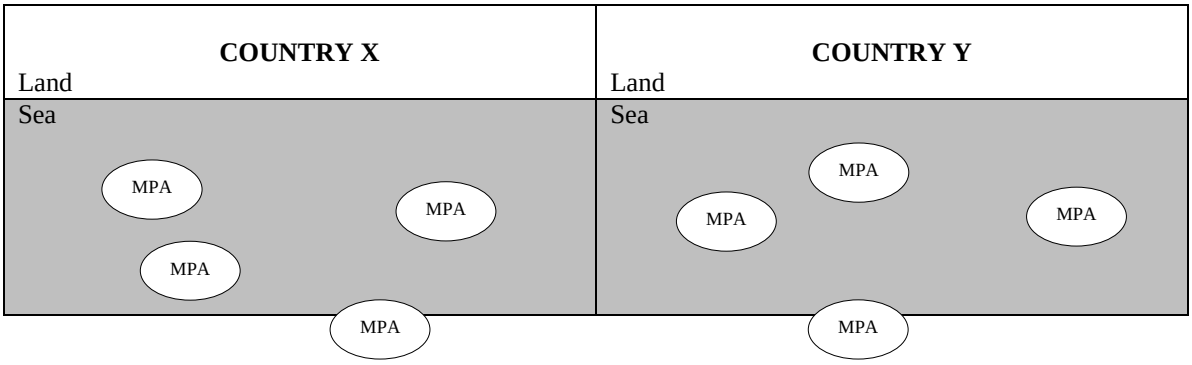
As it was shown in the previous sections, regime theory provides a framework to examine how cooperation emerges at the international level, and what factors contribute to cooperative behavior. Given that in two case studies selected there are still no transboundary networks of MPAs, regime theory will be used as a prospective tool. It appears that regime theory has not been used to analyze the potential for regime creation before even states engage in a negotiation process. It has, however, been used to explain why regimes were not formed despite states entering into negotiations. Still, regime theory does provide a framework that can elicit the differences and similarities between states and how this may affect their cooperative behavior for governing such MPA networks. Analyzing states' capabilities, interests, knowledge and values, will contribute to the identification of the governance requirements of transboundary networks of MPAs at the international level. Finally, recent developments in regime theory oriented towards institutional design provide a framework for the institutional design of governance arrangements for transboundary networks of MPAs.

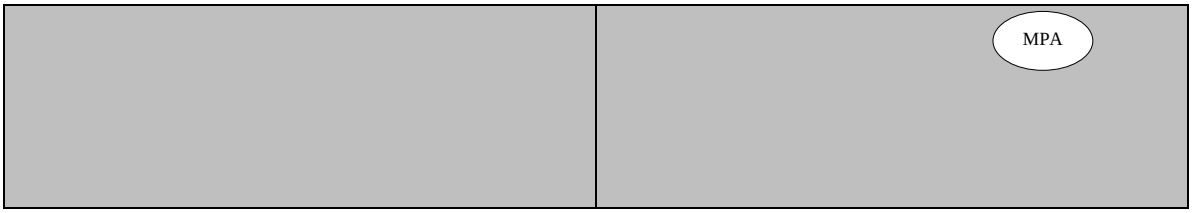
[16] In accordance with Article 5, "Each Contracting Party shall, as far as possible and as appropriate, cooperate with other Contracting Parties, directly or, where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity."

[17] In accordance with Article 192, "States have the obligation to protect and preserve the marine environment", while Article 197 stipulates that "States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features."

Referring specifically to the potential development of transboundary networks of MPAs, the absence of a regime entails that any discussion on the implications of different network configurations for inter-state cooperation are merely conjectural. However, two general situations are envisaged (Figure 5). In the first situation (a), the MPA network straddles the maritime boundary dividing the two states' waters, but none of the individual MPAs is shared by the two states. In the second situation (b), at least one of the individual MPAs is shared between the two states.

Each of these situations has different implications for the type of regime to be accorded by the involved states, if they actually agree on the need to create transboundary networks of MPAs. In scenario (a), the two states would only need to coordinate their actions to ensure that the regime is effective. In scenario (b), however, coordination would not be enough and the two states are to undertake joint actions if the regime is to be effective. These two scenarios could be further divided to accommodate particular arrangements. For example, if scenario (b) materializes, the two states may decide to still just coordinate their actions by attributing to each other the sole management of the section of the MPA on their side of the maritime boundary. They may also perceive their interdependence to be so strong that such a situation would require them to work together and share material, financial and human resources for the management of that particular MPA. These possibilities may be further expanded when specific resources are analyzed and considered in the creation of transboundary networks of MPAs in each transboundary study site.





a) No MPAs in the network are shared

b) At least one MPA is shared

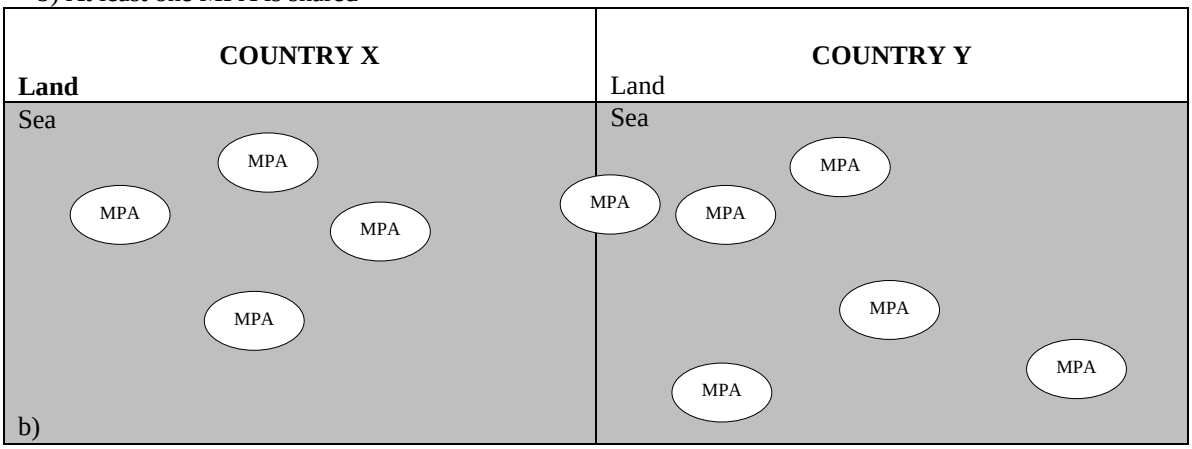


Figure 5 – Scenarios for transboundary networks of marine protected areas

2.3.7 Limitations of Regime Theory

The adoption of any theoretical orientation should not be taken lightly. No matter how well a theory explains world phenomena, it always has its weaknesses. Far from being a complete theory, regime theory has of course its own limitations. These limitations are here discussed, so that they may later inform the data analysis and allow the recognition of the applicability and boundaries of the conclusions.

From its inception, the main criticism of regime theory has targeted the concept of regime. Initially labeled as a “fad” and “woolly” (Strange 1982), the most widely adopted concept of regimes has not made much progress in clarifying its boundaries, leaving open the question of “Where does one regime end and another begin?” (Kratochwil & Ruggie 1986). Of course, several variations of the concept have emerged through the years (Young 1982a, 1998). Though these definitions do not answer the question posed before, this should not be surprising giving that regimes are social constructions and not concrete entities (Kratochwil & Ruggie 1986). One of such definitions has generated another source of criticism. Regimes can also been defined as “patterns of behavior around which expectations converge” (Young 1982b). The essence of this definition – convergent expectations – is very subjective in nature, and in contradiction with the rational and

positivist separation of regimes and the forces that create them (Kratochwil & Ruggie 1986). Though these criticisms have not hindered the development of regime theory, they do raise some concerns about the validity of the concept. There is no simple answer or definition that would overcome all these criticisms. Yet, these definitional difficulties can be reduced by ensuring consistency in the application of the regime concept to the study of cooperation in international relations.

As mentioned before, regimes were conceptualized as single-issued for a long time. Issue-linkage has in the meantime become one of the prominent developments in regime theory, pointing to the need to, under certain conditions, link issues under a single regime to ensure that an agreement is reached on the primary issue. While this innovation allows for an enlarged perspective of regime formation, by also considering parallel developments in other regimes, regime theory neglects other phenomena in international society beyond those of regimes (Buzan 1993). For example, the focus of international relations on regimes shifts attention from aspects of international society, such as mutual recognition of sovereignty, which provide an environment for regimes to flourish. Issue-linkage may partially inform scholars of international relations about how regimes relate to each other. Yet, such analysis is always in relation to a specific regime, and ignores the "big picture" of how regimes related to each other, how states associated with each other, etc. One case in point was that of Russia's ratification of the Kyoto Protocol, reciprocated by the EU's support of Russia's adhesion to the World Trade Organization (WTO). Both regimes were not linked under a single regulatory framework, but they were strategically linked in the international society, and Russia played carefully that linkage in its own favor (Douma 2006).

Studies of international relations have neglected other aspects of international society by considering instead more generally institutionalized behavior (Kratochwil & Ruggie 1986). International organizations have hardly been studied in regime theory, despite their capacity to facilitate international cooperation (Snidal 1992). This is in part attributable to the application of game theory to the study of regimes. Game theory facilitates the study of regimes by analyzing a diversity of situational models that capture many of the possible interactions between actors in the international arena. Indeed, game theory has proven to be an effective tool to analyze the use of shared natural resources such as land, water, fisheries and pollution (Sumaila et al. 2009). Game theory owns its success to its overly simplified portrait of real-world situations. By taking rules as

regimes to define the "rules of the game", regime theory overlooks rules as institutions and its role in cooperation (Snidal 1992). Another international phenomenon that has not caught much attention from regime theory is strategic interactions. Strategic interactions are quite pervasive in the international arena, and exist when actors unilaterally make their actions dependent on others' actions (Lake & Powell 1999). These interactions depend largely on what each actor believes others will do. Considering strategic interactions places emphasis on the "connection between what actors want, the environment in which they strive to further their interests, and the outcomes of this interaction" (Lake & Powell 1999).

Rationalists have been principally responsible for the use of game theory in the study of international regimes. Game theory treats actors' behavior to be guided by rational motivations, and to be oriented toward maximization of individual utility. However, behavior is the result of more than just rational considerations. Other factors include shared values and a common culture that can enable cooperation between states by facilitating joint recognition of the need to address issues of their common interest, and by facilitating communication in that regard (Hurrell 1995). Also, states' decisions are not just contingent on costs and benefits but depend on notions of justice and fairness. Consequently, states may refuse to enter into a regime that, despite improving their individual utility, they perceive to be unfair (Hurrell 1995).

Finally, rational conceptualizations of state actors presume these to be unitary entities. However, a state is in fact the result of the interplay between the various domestic forces, its political leadership, and the international environment in which they are located. The domestic dimension in particular contributes to the definition of a state's interests, and affects also regime implementation. The domestic context operates in this regard in three distinct ways: (i) the the international rules emanating from a regime require transposition into the domestic legal framework, often through adaptation to the national context; (ii) domestic law and international law are mutually dependent, as the former ensures implementation of the latter, and this influences the content of the former; and (iii) the compliance pull of international law is partially a result of the domestic context, where many of the political costs of defecting from international rules are observed (Hurrell 1995).

Importantly enough, regime analysis acknowledges that its field of inquiry does not cover the whole realm of today's international relations, even if we take into account

both international and transnational regimes (Mayer et al. 1993). As it evolved, regime theory has been able to slowly expand its coverage of international relations, though it is hardly a theory that fully explains the nature and consequences of international relations.

Regime theory has more recently been preoccupied with institutional design. In taking institutions as influential in enabling international cooperation, the task of explaining how they are formed has been partially replaced with how to design them. The rational design framework proposed by Koremenos *et al.* (2001a) posits institutions to be rational responses negotiated to address the problems faced by international actors. However, institutions such as regimes do not merely conform to rational rules. Other notions, such as fairness and justice, also contribute to shape the institutional design of a regime (Wendt 2001). The rational design framework, while useful, is therefore limited in its explanation of how institutions are designed (Pierson 2000; Wendt 2001). These limitations do not preclude extracting some useful aspects of the rational design framework. Chiefly, the rational design framework offers a decomposition of the dimensions of international institutions that should not be neglected, but that does not account for all possible relevant dimensions of institutions with impact on their outcomes. In particular, it has been pointed that it does not pay sufficient attention to variation in norms, which, together with principles, are the core components of regimes (Duffield 2003; Krasner 1982). Variation in norms can be observed regarding their specificity, durability and concordance (Legro 1997). Specificity of a norm denotes its simplicity and precision, reflected in actors' understanding of their content and implications. Durable norms are those that are maintained over the course of time, and that resist deviations. Norm concordance refers to its acceptance in international relations.

One general caution is appropriate regarding institutional design as a whole. Institutional design as a framework to devise institutions and predict their consequences is still in its infancy. Adopting a framework that includes more than just rational factors and explanations for institutional variation represents a step forward in the collective effort to improve existing institutions and create new ones. To ignore this is to assume that "institutional designers" have the necessary knowledge to fully understand the problem in question, know how to design an institution to better tackle that problem, and the institutional outcomes are those initially expected (Pierson 2000). On the contrary, more often than not institutions will have unpredicted and even undesirable outcomes. For example, a limited comprehension of the problem to be tackled by a regime is

unfortunately a persistent source of institutional ineffectiveness (Wendt 2001). The uncertainty associated with institutional design is further compounded by the possible interactions between the various factors, resulting in institutional arrangements that are not easy to predict.

2.4 Linking Common Pool Resource Theory and Regime Theory

As it was shown in the previous sections, these two theories have the potential to contribute differently to the analysis of the governance requirements of transboundary networks of MPAs. Mozambique and Tanzania, and Mozambique and South Africa share different marine resources of conservationist interest that can be considered common pool resources. The multi-jurisdictional nature of resources requires solutions at the state level. CPR theory can provide a framework to identify the current governance arrangements in place to govern the extraction and use of shared resources. CPR theory will then be instrumental in providing information on how appropriation of marine resources is currently regulated by each state and by local communities. This will constitute an important input to define exactly what type of problems these resources face, and how they can be best addressed at the bilateral level.

The joint management and conservation of such resources through transboundary networks of MPAs necessitates some degree of bilateral cooperation between states. Regime theory provides an analytical framework that can support the identification of conditions enabling and restraining cooperation between each set of two states. Additionally, regime theory can inform the creation of institutional designs for the governance of transboundary networks of MPAs that are best tailored to the specific problems faced in each case study.

CPR theory and regime theory coincide in their focus on collective action for the purpose of achieving joint gains or avoiding joint losses (Mayer et al. 1993). They differ however in their basic concepts, methodological approaches and research practices (Young 2002). CPR theory is more concerned with the factors that explain the emergence of CPR regimes, and not with institutional design of those same regimes. Also, property rights as conceived in CPR theory do not translate directly into the global level. The global commons, in opposition to local commons, are differentiated on the basis of jurisdiction, instead of property (Young 1995). While CPR theory examines the

conditions that enable cooperation between resource users in sustaining management regimes that avoid central authority and markets, regime theory tries to unveil the conditions that would facilitate cooperative behavior between states in the absence of an enforcement authority (Martin 1995). These differences highlight the difficulties of trying to transpose (scale-up) local cooperative behavior to the international arena, and vice-versa (scale-down).

Despite these differences, these two theories are not irreconcilable and are particularly useful in exploring cooperation options in the context of global commons (Martin 1995). CPR theory can inform regime theory of the descriptive characteristics of the resources at stake, the people that use them, and what institutional arrangements are in place. These characteristics will contribute to elicit the power-based, interests-based, knowledge-based and contextual factors that influence international cooperation and institutional design. Linking CPR theory and regime theory generates a framework to examine multi-level governance issues like those posed by transboundary networks of MPAs (Figure 6).

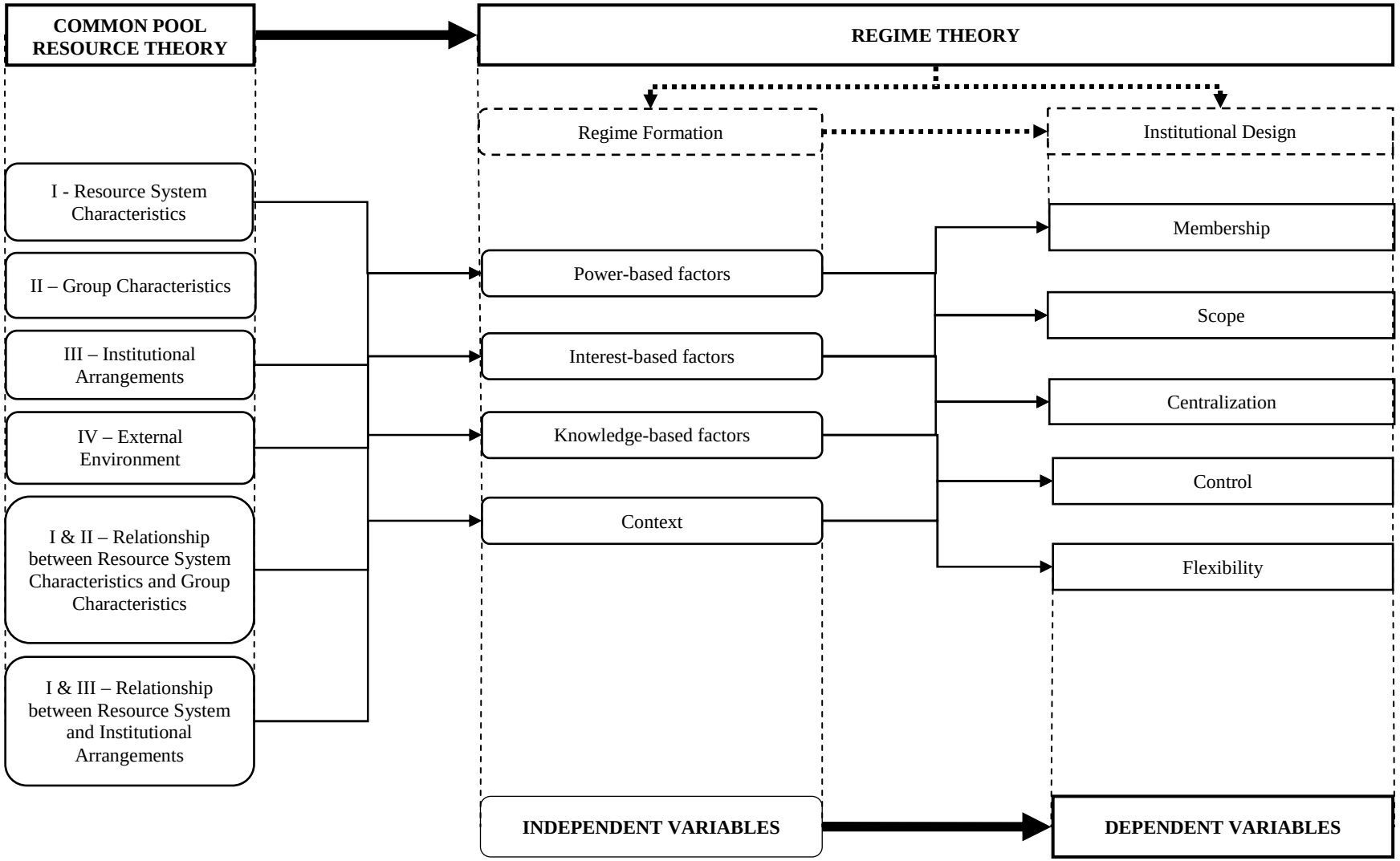


Figure 6 – Linking common pool resource theory and regime theory

3. METHODOLOGY

The previous chapters presented the need for transboundary networks of marine protected areas given current trends in protected area development and marine conservation. The theoretical underpinnings of common pool resource theory and regime theory were explained, as well as how this theoretical framework can elicit the potential for cooperation in the creation and management of transboundary networks of marine protected areas. This chapter presents the methodology, consisting of a research approach, research design, and methodological techniques.

3.1 Research Scope

The overall goal of this research was to identify the governance requirements for cooperation in the creation and management of transboundary networks of marine protected areas, an emergent tool for transboundary marine conservation. Governance requirements are here defined as the courses of action that states can undertake to achieve a proposed objective, the institutional arrangements that serve that objective, and the decision-making procedures adopted in that regard (Hanna 1999; Symes 2007). In other words, governance requirements concern *how* states and other actors can cooperate for the successful creation and management of transboundary networks of MPAs. The goal of this research was pursued by focusing on what is needed to facilitate bilateral cooperation that can ensure the governance of transboundary networks of marine protected areas in two transboundary areas in East Africa (Kooiman 2008). First, the governance requirements of transboundary networks of marine protected areas are determined by the physical characteristics of shared natural resources, the dependent users and interests, the modes according to which they are utilized, and the institutional arrangements currently governing their utilization. Second, the influence of these local conditions over cooperation is further compounded by the interplay between power, interests and knowledge, influencing the behaviour of international actors.

This research aims to improve the comprehension of the limitations and potentials of transboundary networks of marine protected areas. Such knowledge is essential for the success of this marine conservation tool that is still incipient, but likely to gain momentum given current trends in marine conservation.

This research addressed two transboundary marine areas where the creation of transboundary networks of marine protected areas has been explored, namely (1) the border region between Mozambique and Tanzania, and (2) the border region between Mozambique and South Africa. The research project TRANSMAP (Transboundary networks of marine protected areas for integrated conservation and sustainable development – biophysical, socio-economic and governance assessment in East Africa) has developed a scientific basis for the creation of TBNMPAs in the two study areas. However, it has not addressed the question this research attempts to answer. In other words, the project provided a substantial amount of information that supports the creation of transboundary networks of marine protected areas, but the question of how states can cooperate in their creation and management remains unanswered.

3.2 Research Approach

This thesis sought to establish causal relationships between the existing situations in the two transboundary areas, the behaviour of domestic and international actors, and governance requirements for the creation and establishment of transboundary networks of MPAs in this region of Africa.

A case study approach was selected to investigate the potential for cooperation in the creation and management of transboundary networks of marine protected areas, because it is preferred when the studied phenomenon is hard to control and when the current phenomenon cannot be easily distinguished from the context (Yin 2003). Its advantage over historical analysis is the ability to process a wide variety of evidence, such as interviews, documents and observation, this being its main strength. Case studies are preferred over experimentation due to their ability to deal with phenomena that cannot be controlled. Investigating causal relationships in a small number of cases enables research on (Mitchell & Bernauer 1998):

- important variables that are difficult to quantify (e.g., power, interests, or knowledge);
- theoretically important, empirically rare, or previously ignored cases;
- innovative (but, by their nature, rare) international environmental policy strategies;
- causal, rather than merely correlational, relationships.

The case study approach does not preclude the use of other research approaches. For example, surveys and ethnographies can be integrated in case studies. While case study approaches are often criticized for their lack of "hard" quantitative analysis, the latter is not excluded and is often used. In sum, a case study is:

> "*an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*" (Yin 2003).

The research approach followed here results from an adaptation of the case study approach, and it is depicted in Figure 7.

3.3 Research Design

A research design is the logical connection between theory, research questions, data collection and ultimately the conclusions to be drawn (Yin 2003). Establishing a research design requires (i) using existing theories to define the research questions that will orient the research, (ii) building hypotheses to be tested, (iii) selecting the case studies, (iv) defining what data is collected and how it is collected, (v) and analysing the data. A research design is not complete without a brief examination of ethical issues concerning data collection and analysis, and the creation of mechanisms to ensure construct validity, internal validity, external validity and reliability (Mitchell & Bernauer 1998; Yin 2003).

3.3.1 Insights from Existing Theories

The theoretical framework presented in section 2.2 provides an analytical framework to examine the characteristics of common pool resources, their users, and those of their institutional arrangements that are conducive to the establishment of common property regimes. While defining the type of property regime for transboundary networks of MPAs is not the main purpose of this research, the analytical framework provided by CPR theory defines the issues confronting the creation of transboundary networks of MPAs.

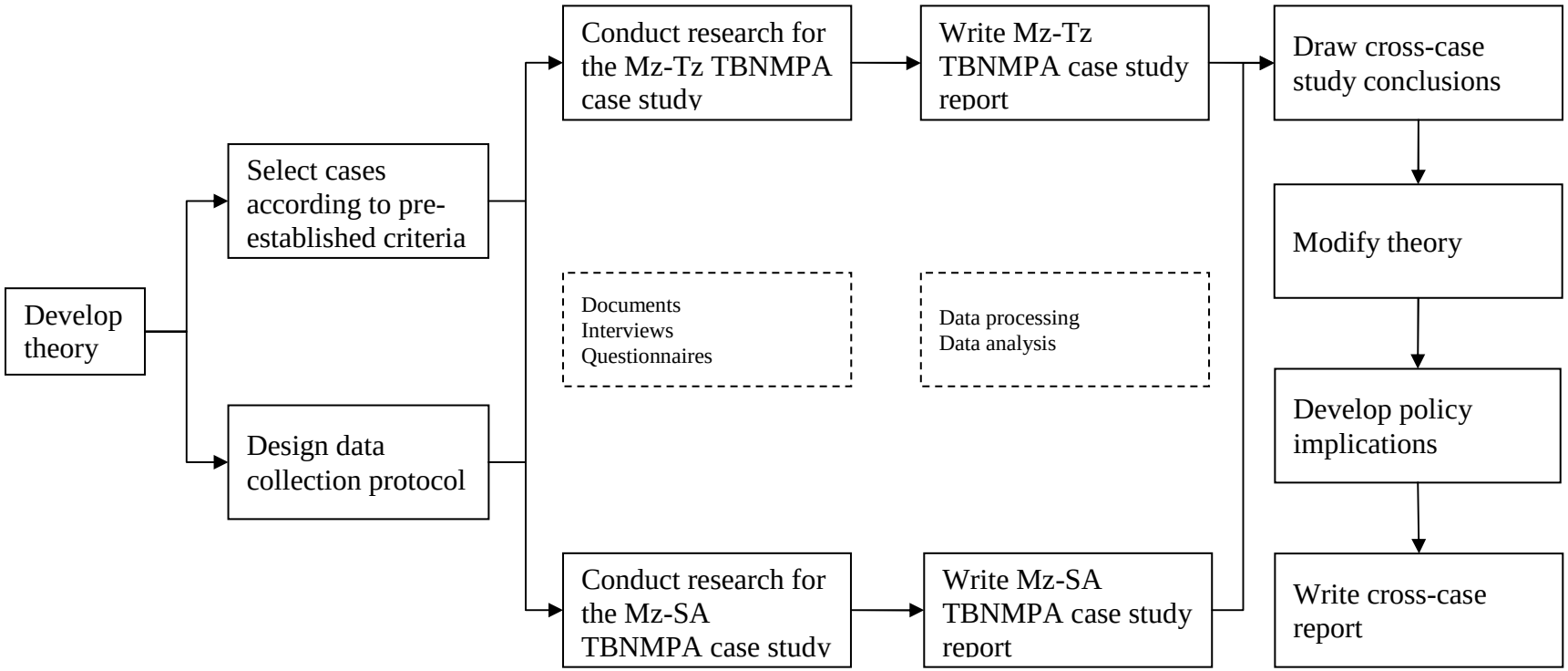


Figure 7 – Case study approach

Adapted from Yin (2003). Mz – Mozambique; Tz – Tanzania; SA – South Africa; TBNMPA – transboundary networks of marine protected areas.

In turn, these issues provide the basis to examine the potential for cooperation. The theoretical framework presented in section 2.3 discussed the importance of power-based, interest-based, knowledge-based and contextual factors in the emergence of cooperation. Each set of factors will have a distinct influence over cooperation, depending on contextual aspects and the interactions between factors, within the same set or otherwise. The manner in which each factor influences cooperation is likely help shape a regime's institutional design in terms of its membership, scope, centralization, control and flexibility.

3.3.2 Detailed Research Questions

The propositions and main research question of this inquiry were presented in section 1.3. The research question guiding the elaboration of this thesis is:

> *What are the governance requirements that may facilitate cooperation in the conservation of shared natural resources?*

The inquiry set by this research question is of a predictive nature, and guided by the following assumptions:

- The actors capable of significantly shaping a state's interests can be identified, characterized and their potential influence measured;
- A state's capacities, interests and knowledge can be defined and characterized;
- The capacities, interests and knowledge of two potentially cooperating states can be examined interdependently to identify aspects enabling and restricting cooperation;
- The institutional design of a regime governing international cooperation in an issue can be informed by the participating states' power, interests and knowledge and the context within which it will emerge.
- Existing international obligations and commitments concerning marine conservation are, to a certain extent, conducive to international cooperation.

Taking these assumptions in consideration, the main research question is answered by providing further answers to the following subquestions, which were used to guide data collection and analysis:

1. What are the physical, resource user and institutional characteristics of the resources that are the object of the international cooperation for their conservation?
2. How do the different characteristics of the resources influence state actors' preferences?
3. What are the capacities, interests and knowledge of states concerning the transboundary conservation of these resources?
4. What are the capacities, interests and knowledge of actors potentially influential in shaping a state's position?
5. How may potentially influential actors affect states' preferences?
6. How do the power, interest and knowledge-based characteristics of interdependent states interact to limit and enable cooperation?
7. What international principles, rules and procedures to which the states subscribe facilitate/guide international cooperation in the case study areas?
8. How can a regime be designed to address possible constraints to cooperation?

3.3.3 Selection of Case Studies

The selection of case studies conforms to replication logic rather than of sampling (Yin 2003). Borrowing language from experimental science, this method entails that each case study is an experiment in itself and therefore does not constitute a sample within an experiment. The cases were selected on the basis of the following criteria:

- Each case study must have potential for neighboring states to cooperate in creating and managing transboundary networks of marine protected areas. The potential for cooperation is here defined by: the absence or lack of success of domestic or bilateral exchanges in this regard; the political commitment to transboundary conservation and marine conservation of each state, reflected respectively in the existence of transboundary protected areas on land and of marine protected areas in each transboundary region, or in public statements; the availability of scientific and technical knowledge and skills related to the conservation and management of marine biodiversity, and associated economic and subsistence activities; the availability of internal financial resources to sustain cooperation or, in the alternative, the availability of external assistance.

- There is no management regime of a transboundary character in operation in the geographical area of the case study at the time the research was undertaken.
- The case study must correspond to a geographical area of particular marine ecological importance.
- The case study or, more precisely, its geographical area, should be sufficiently familiar to the researcher and enable access to and retrieval of potential data.
- The case studies should have at least one state in common to serve to a limited extent as a control variable. By having one state involved in the two case studies, it should be possible to contrast the effects of that state's preferences and their interactions in one case with the other case.

The two cases selected concern the transboundary marine regions shared by Mozambique and Tanzania and by Mozambique and South Africa. Both transboundary regions have been the object of a research project that provided knowledge to the three states to assist with the creation of bilateral transboundary networks of MPAs (TRANSMAP 2008e). TRANSMAP produced biophysical, socio-economic and governance assessments of both transboundary regions. The project did not investigate the potential for cooperation between each pair of states, as the project was developed under the assumption that its results would be used by the three states. While there is one MPA on both sides of the boundary in each of the two transboundary regions, there was no functional transboundary management regime in place in either at the time this research was undertaken. At the time of writing, it was questionable whether the respective management authorities even communicated their MPA management practices and results among them. However, the three states possess significant experience in transboundary terrestrial conservation.

Together with Zimbabwe, Mozambique and South Africa are responsible for the Great Limpopo Transfrontier Park. They have also been cooperating, along with Swaziland, for the creation of transboundary protected areas through the General Trans-Frontier Conservation and Resource Area Protocol (TFCRA Protocol 2000). This General Protocol supersedes five others that specify transboundary protected areas to be created, one of which consists in a transboundary MPA between Mozambique and South Africa: the Lubombo Ponta do Ouro–Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area (Ponta do Ouro-Kosi Bay Protocol 2000). This protocol codifies

Mozambique's intention to create transboundary MPAs with its neighbors (Wells et al. 2007).

Mozambique and Tanzania are in the process of establishing an elephant corridor connecting the Selous Game Reserve in Tanzania with the Nyasa Reserve in Mozambique. In the past few years, they have also engaged in exchanges – so far unsuccessful – regarding the creation of an MPA that would fill the void in marine protection between the Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP), in Tanzania, and the marine section of the Quirimbas National Park (QNP) in northern Mozambique. In addition to Mozambique's commitment toward its coastal neighbors, Tanzania has also recognized the need to share with Mozambique a similar environmental regime for this transboundary marine region (Ministry of Natural Resources and Tourism 2006).

Both case studies are an integral part of the Eastern African Marine Ecoregion, which has been considered a priority area for marine conservation by WWF (WWF & EAME 2007). WWF has provided financial and technical assistance to the Quirimbas National Park. The Peace Parks Foundation (PPF) played a relevant role in the Great Limpopo Transfrontier Park. Additionally, the researcher participated in the research efforts of TRANSMAP during its four years by participating in the fieldwork of the socio-economic stream and by providing significant input into the governance stream of the project. These geographical areas offer a very good opportunity to use one state as a control variable across the two cases. This is particularly important to contrast the effects of the "control" state's preferences and their interactions in one case with the other case. Considering these aspects in aggregate, it is reasonable to assume the existence of a strong potential for cooperation in the conservation of shared marine resources in the two transboundary regions.

Given limitations in research resources, the whole range of species and habitats that underlie interdependence between states in each case area was not considered. Instead, one habitat – coral reefs – and one species – Indo-Pacific humpback dolphin (*Sousa chinensis*) – were selected for the following reasons:

- The selection of both a habitat and a species attempts to substantiate the widely recognized need to protect both ecologically significant habitats and charismatic species through MPA networks.

- Both coral reefs and Indo-Pacific humpback dolphins can be considered common pool resources, given that exclusion of other users from extracting them is costly and removal of resource units by one user diminishes the availability to other users.
- These CPRs differ most prominently in their mobility. Coral reefs can be considered stationary not only because of their sessile nature, but also because the fish populations that use them as habitat are relatively residential. Indo-Pacific humpback dolphins, on the other hand, are mobile and can introduce different institutional challenges.
- Both coral reefs and Indo-Pacific humpback dolphins have high conservation needs in both study areas and require conservation measures to ensure their preservation (TRANSMAP 2008c).
- They have socio-economic importance: coral reefs are typically important fishing grounds for coastal communities, while Indo-Pacific humpback dolphins, along with other cetaceans, can be targeted by dolphin watching operators and are targeted by fishers that use them for shark bait. This makes them quite prone to conservation through bilateral cooperation between states.

3.3.4 Data Collection

Data collection aimed at gathering good information that answers the research questions (Creswell 1998). Two forms of data collection were considered necessary given the nature of the research inquiry. Archival and documental data contribute to set the scene that precedes fieldwork, giving the researcher a better grasp of the existing conditions. This form of data collection enabled triangulation through the use of multiple sources of evidence, particularly after the fieldwork, substantiating claims that evidence collected in the fieldwork may not be strong enough to make, and disconfirming others. Ethnographic methods were adopted in the fieldwork. Ethnography was used as the methodological basis for data collection because of its capacity to explore the behaviour of social groups, including institutions and their organizations (Creswell 1998). Three ethnographic methods were used: participant observation, questionnaires, and interviews.

3.3.4.1 Archival Research

Archival research is particularly important to provide contextual information concerning the two study areas. Specifically, peer-reviewed scientific literature and scientific information produced by the TRANSMAP project were used to select the common pool resources targeted by the research, and to identify their characteristics. The reports produced by the TRANSMAP socio-economic and governance teams were instrumental in setting the scene in which the fieldwork is to be carried out, and in identifying the relevant actors in face of the research objectives. These actors are here considered as stakeholders, that is, individuals, groups and organizations who are affected by or can affect the outcomes of a decision or action (Reed et al. 2009). Yet, stakeholder identification was not limited to a review of the literature on the two regions. During the fieldwork the researcher gained a deeper understanding of the scene of the research inquiry so that more stakeholders were identified.

These two main sources of information were also complemented with governmental reports concerning the marine environment in the three states and abundant information produced by several NGOs operating the three states. The analysis of these documents allowed the identification of possible grounds for cooperation by highlighting similar threats to shared resources on both sides of a border and interdependencies in the use of those resources.

3.3.4.2 Ethnographic Methods

Three ethnographic methods were adopted: semi-structured interviews, participant observation, and questionnaires. These methods generated different types of data in distinct field conditions. For each transboundary area, two sites were selected, one on each side of the border and within the existing marine protected areas. This preference aimed at assessing how the selected resources are managed within MPAs in the three states.

3.3.4.2.1 QUESTIONNAIRES

Questionnaires were used to collect information on the selected common pool resources, namely their uses and the importance users attribute to them, the institutional arrangements in place to govern their use, and the relation between these aspects and the characteristics of each resource. These questionnaires assisted in the systematized collection of information, and their administration and data processing were less time

demanding than interviews. Though careful consideration was given to issues of representativeness of the data collected, the use of questionnaires did not aim at achieving statistical significance. Two questionnaires were produced: one directed at those involved in fisheries, and another one directed at tourism operators (Appendix I).

3.3.4.2.2 PARTICIPANT OBSERVATION

Participant observation contributed to a deeper understanding of the characteristics of the resources. While there is abundant literature on the uses of coral reefs in the region, the knowledge on humpback dolphins is less developed. More detail on this cetacean can be obtained from observing and interacting with individuals or groups of individuals that may know more about humpback dolphins than what has been reported in the literature until now. Participant observation was planned to last two weeks at each site to ensure a more complete understanding of the characteristics of the resources.. However, it lasted on average 2-3 days. This was because fieldwork logistics consumed more time than it was initially predicted, and significant time was also spent in obtaining answers to questionnaires from respondents. Despite the very short duration, participant observation was important for the researcher to embed in the study sites. Participant observation assisted an understanding of how resources were being used, complementing the use of questionnaires, and identifying stakeholders that may have been absent from the literature.

For the purpose of this research, a stakeholder was defined as: (i) individuals, groups of individuals or organizations that engage in consumptive or non-consumptive use of coral reefs and/or of humpback dolphins in the two transboundary regions; (ii) individuals, groups of individuals or organizations that may affect the outcome of measures aiming at the conservation of these resources in the two transboundary regions; and (iii) individuals, groups of individuals or organizations that may be affected by measures aiming at the conservation of these resources (Reed et al. 2009). Participant observation informed, to a limited extent, the application of questionnaires and of interviews.

3.3.4.2.3 INTERVIEWS[18]

[18] While questionnaires are more appropriate to produce knowledge on a certain phenomenon in face of a potentially large number of informants and little time to engage with them all, interviews are more adequate

The aim of the interviews was to understand how different actors see cooperation in the conservation of specific marine resources shared between two states. Three interview scripts were designed, following an identification of the actors having knowledge that can answer the research questions (Appendix II). While this "data mining" orientation of the interview design process was dominant in its initial phases, such position was relaxed during the interviews by adopting a more "interviewer as traveller" attitude (Kvale 2007). The first interview script was oriented to elicit the motivation and ability of each state to cooperate in the conservation of shared marine resources. For this purpose, the state institution that would lead the negotiation process with a neighbouring state for the purpose of cooperation in the conservation of shared marine natural resources was identified. A second, but more limited, set of interviews targeted actors previously involved in transboundary conservation initiatives in each state. The purpose of these interviews was to understand the potential successes and failures of transboundary cooperation between each pair of states. Finally, a third set of interviews was conducted with representatives of institutions and organizations potentially influential in shaping a state's motivation to cooperate in the conservation of shared resources. This included governmental departments with a mandate pertaining activities in each transboundary region (e.g., fisheries and oil drilling), and non-state organizations that may have an interest in marine conservation in any of the two transboundary regions (e.g., environmental NGOs and scientific community).

3.3.5 Data Analysis

Data analysis was undertaken after all questionnaires were processed, results converted to electronic format, interview reports were verified by the interviewees, and field notes from participant observation transcribed to an electronic file. Data that names interviewees and questionnaire respondents was omitted from the electronic files to ensure anonymity and enable the researcher to concentrate on the information provided.

The analysis was initiated by thoroughly studying all the data collected and annotating them. For each case study, a description was written giving a detailed view of the factual context of the research inquiry. This was followed by the creation of a small

when the number of informants is smaller, and their insights, more than factual knowledge, is sought (Kvale 2007).

number of codes to reflect various informative dimensions of the data. The categorical aggregation sought preliminary general answers to the central question and subquestions of the research. Data analysis continued with a focus on single aspects that were examined independently from other aspects. Direct interpretation was framed by the theoretical framework provided in Figure 6 in Chapter 2. An iterative interpretation process was then initiated by moving back and forth from single aspects to more general and substantiated explanations. This interpretation process sought to identify patterns in the data and to establish links between them. Finally, generalizations were sought from the interpretations provided..

3.3.6 Ethical Issues

Any research study of this nature deals unavoidably with ethical issues concerning the use of human participants. Data collection depends in this case almost exclusively on the willingness of various persons to reveal not only facts, but also their thoughts, opinions and ideas regarding the matter in question. The researcher benefiting from this realm of information and knowledge has essentially four obligations toward the research participants:

1) Non-maleficence, or the duty not to harm in any way the research participants;
2) Beneficence, or the duty to ensure that research involving human participants yields some benefit, rather than just being carried for its own sake;
3) Autonomy or self-determination, or the duty to respect the values and decisions of the research participants;
4) Justice, or the duty to treat research participants equally (Murphy & Dingwall 2001).

The potential to cause unintended harm to research participants was reduced by ensuring both their confidentiality and anonymity. This was and will continue to be achieved by decoupling participants' identification information from research reports, and by handling and storing research data until five years after the publication of relevant research results in peer-review publications. Research data storage is password-protected, and accessible only to the author of this thesis. Five years after publication of relevant results, physical and electronic research data will be destroyed. To avoid the misuse of a

participant's knowledge and perceptions[19], participants were included in the interview review process. Interviewees were given the opportunity to review the report of their inputs to the inquiry tentatively within 48 hours of the interview, and thus correct any misstatements that may have been made by the researcher. Participants responding to questionnaires are expected not to be the subject of biased reporting on the side of the researcher, given the very straight and direct nature of the questions posed in a questionnaire, when compared with the more open nature of an interview.

In terms of the benefits it may generate, this inquiry is expected to not only advance knowledge on how transboundary networks of MPAs may be created, but also on how obstacles to this endeavour may be overcome. Moreover, fieldwork with local communities elicited a greater understanding of how they in general, and the subgroups within them in particular, relate to the CPRs at stake. Lastly, it is expectable that research results can be generalized to situations where a potential for transboundary cooperation may exist but that it is yet to be realized.

All research participants contributing to the research were given the opportunity to clearly decline or accept to participate in this research. Interviewees were informed of the consequences of their participation in the research through a consent form (Appendix III).[20]. Participants targeted by questionnaires and participant observation were informed in a more general manner. Given that many local communities are illiterate, verbal consent was sought following a brief explanation of the nature and purpose of the research.

[19] This commonly results from a lack of accuracy in the researcher's reporting of the interactions with the participants.

[20] The research form details (i) the main purpose of the study, (ii) the study design, (iii) the criteria to define who can be a research participant, (iv) details about who is conducting the research, (v) what research participants need to do to contribute to the inquiry (Dalhousie University 2007)

PART II – RESEARCH PAPERS

4. PROTECTING CORAL REEFS AND HUMPBACK DOLPHINS

GRILO, C. (*Submitted*). "Transboundary Marine Protected Areas in the Western Indian Ocean: How Adequate Are They?" *Marine Policy*.

Abstract: Many threatened marine species and habitats straddle more than a single national jurisdiction, making transboundary marine protected areas (MPAs) one possible tool for their conservation. However, such area-based tools are not appropriate for all levels of resource mobility, are not capable of tackling all threats, and pose various governance challenges arising from multiple jurisdictions and interests. Transboundary MPAs have been proposed to protect marine habitats and species in the Western Indian Ocean. To assess their adequacy, the ecological characteristics, threats, and institutions associated with a static resource (coral reefs) and a mobile resource (Indo-Pacific humpback dolphin) in two coastal border regions were examined. This assessment revealed some limitations of transboundary MPAs in the Mozambique-Tanzania and Mozambique-South Africa border regions, such as significant knowledge gaps, inability to tackle land-based pollution, and difficulties in law enforcement in remote areas. It also showed that transboundary MPAs can protect continuous ecosystems divided by political borders, though existing fisheries co-management institutions on both sides of a border may be a better option. Most importantly, this assessment illustrates the importance of conducting similar reviews before countries commit to establish transboundary MPAs, and highlights the need to tailor conservation regimes to on-the-ground contexts.

Keywords: transboundary conservation; marine protected areas; Western Indian Ocean; coral reefs; Indo-Pacific humpback dolphins.

1. INTRODUCTION

Marine Protected Areas (MPAs) are widely advocated as one of the best tools available for the protection and conservation of marine species and habitats [1, 2], as well as for the enhancement of fish stocks [3, 4]. Often, threatened marine species and habitats straddle multiple national jurisdictions (e.g., through migrations or geographical extent, respectively), or are exposed to multijurisdictional threats (e.g. fishers from neighbouring

country). In such cases, it is wise to consider the creation of transboundary MPAs, i.e. MPAs that straddle one or more borders between states [5].

Transboundary MPAs have the potential to protect marine species and habitats by joining conservation efforts of different countries, their institutions and peoples. Yet, just like subnational MPAs, transboundary MPAs need to be tailored to their specific contexts. The ecological characteristics of threatened habitats and species are determinant to the size and shape of an MPA [6, 7]. For example, a well-defined habitat will be easier to protect through an MPA, due to its lack of mobility, while a species with low site fidelity and high dispersal movements, exceeding the size of an MPA will receive only limited protection [8, 9]. It is also essential to know the threats affecting vulnerable resources, as these should determine directly the objectives of MPAs and the measures to be adopted so that these same threats are minimized. Many MPAs have been created with the broad goals of "protecting biodiversity" and "fisheries enhancement" [8], often lacking detailed objectives for the specific ecological features they purport to protect [10]. Finally, MPAs cannot be created without consideration for the institutional and social contexts in which those resources are used [11-13].

This paper complements previous research on transboundary MPAs proposed for the Mozambique-Tanzania and Mozambique-South Africa border regions [14-16], by assessing their adequacy in the protection of coral reefs and Indo-Pacific humpback dolphins. Specifically, it investigates (i) the ecological characteristics of those two marine resources, namely mobility and connectivity [17, 18]; (ii) the threats currently affecting them [13, 19]; and (iii) the institutional arrangements that already govern these threats [20, 21], including those of the existing MPAs that have been proposed to be linked through larger transboundary MPAs. The overall goal of the paper is to elicit the added value of creating transboundary MPAs in these two transboundary marine regions, in face of their particular contexts. The paper is not an evaluation of the effectiveness of the existing MPAs; instead, it tries to show the adequacy of transboundary MPAs to protect certain resources that are under concrete threats and are governed by particular institutional arrangements.

The following section describes the selected study sites and resources, as well as the methodology. In sections 3 and 4, the ecological characteristics, threats and institutional arrangements related to each resource in the Mozambique-Tanzania and Mozambique-South Africa border regions, respectively, are presented. These are

discussed in a comparative manner in Section 5 to highlight the benefits and limitations of creating transboundary MPAs in these two particular contexts. Section 6 concludes the paper, suggesting that similar assessments be conducted before transboundary MPAs are created, and that these should compare MPAs to other marine management tools.

2. RESEARCH CONTEXT

Several countries bordering the Western Indian Ocean have been making significant progress in the creation of MPAs to protect marine biodiversity [22]. As part of these efforts, Mozambique, South Africa and Tanzania are also working toward the creation and joint management of transboundary MPAs around their maritime borders to protect their marine biodiversity, support the sustainable use of marine resources, promote tourism and contribute to poverty reduction [23-25].

2.1 Study areas

The border regions between Mozambique and Tanzania (Fig. 1) and between Mozambique and South Africa (Fig. 2) are quite remarkable in terms of their marine biodiversity, and have been classified as priority seascapes of the Eastern African Marine Ecoregion by WWF [26]. Important marine and coastal habitats include coral reefs, mangroves, seagrass beds, rocky shores, sandy beaches, and deepwater canyons, which support a variety of species that includes marine invertebrates, reef fish, pelagic fishes and highly migratory fishes, and charismatic megafauna (whales, dolphins and dugongs).

The border region between Mozambique and Tanzania is considered to have Outstanding Universal Value, and has been recommended for inclusion into the World Heritage Site list [27]. The two countries have engaged in the past few years in occasional conversations toward the creation of a transboundary MPA that would connect the MPAs that already exist on both sides of the border. The Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP) was created by Tanzania in 2000 in its southernmost coastal region, Mtwara. It is adjacent to the border with Mozambique, has about 30.000 inhabitants, and covers an area of 650 km^2. The Quirimbas National Park (QNP), established in 2002 in Mozambique, is inhabited by approximately 130.000 people living within its 7.500 km^2, a fifth of which covers coastal and marine habitats and species in the southern and central sections of the Quirimbas Archipelago. QNP is located 200 km from the border with Tanzania, and it is this geographical gap in protection – the northern section of the

Quirimbas archipelago – that both countries have been trying to address. Tanzania has publicly recognized the need to share with Mozambique a similar environmental regime applicable to their common marine environment [28]; in Mozambique, a proposal was prepared in 2006 to create a protected area adjacent to MBREMP, covering marine and terrestrial habitats, but it is yet to be implemented.

Mozambique has also engaged in conversations with South Africa regarding the creation of a transboundary MPA between the two countries. Like Tanzania, South Africa also has an MPA bordering with Mozambique. The Saint Lucia and Maputaland Marine Reserves constitute the marine component of the iSimangaliso Wetland Park (IWP). IWP results from the amalgamation of several pre-existing terrestrial and marine protected areas, and was declared a World Heritage Site in 1999. It covers an area of 3585 km^2 that is inhabited by 2.000 people, and has 600.000 people living near its borders [29]. In August 2009, Mozambique created the Ponta do Ouro Partial Marine Reserve (POPMR) with 678 km^2, which is contiguous with the border with South Africa. This MPA results from the seaward extension of the Maputo Special Reserve. Both Mozambican protected areas are inhabited by a total of 12.000 people [30], and have been in the tentative list of World Heritage Sites since August 2008. The creation of POPMR fulfils the agreement Mozambique had signed with South Africa in 2000 for the creation of the Lubombo Ponta do Ouro–Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area.

2.2 Conservation surrogates

For the purpose of this paper, one habitat and one species were used as surrogates for assessing the adequacy of the proposed transboundary MPAs. Two aspects explain this choice: (i) current practices for MPA design are based on the selection of both critical habitats [31, 32] and individual species, especially when the latter have particular conservation importance and/or are popular among the general public [33, 34]; (ii) habitats and species have distinct levels of mobility, which may create diverse interdependencies among countries trying to protect them. The habitat coral reef and the species Indo-Pacific humpback dolphin (Sousa chinensis) were chosen because they both occur in the two study areas and because of their conservation importance and needs.

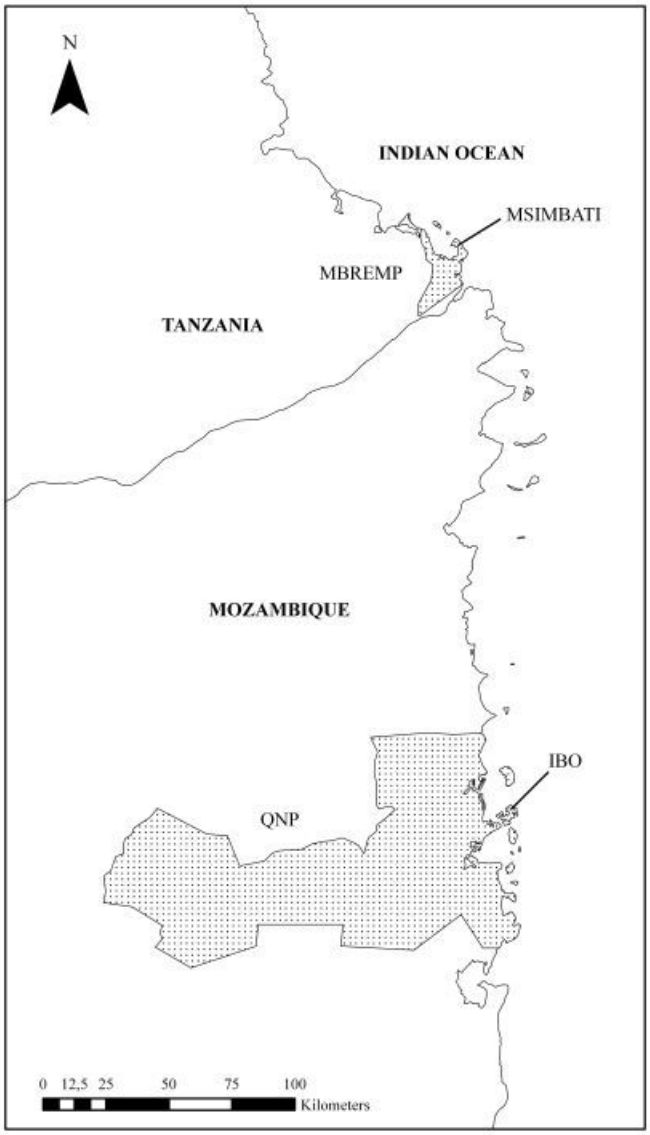


Figure 1 – Border region between Mozambique and Tanzania (Source: World Database on Marine Protected Areas). Description: shaded areas indicate the two MPAs in the region, MBREMP – Mnazi Bay-Ruvuma Estuary Marine Park and QNP – Quirimbas National Park, and single straight lines indicate the location of each MPA's study site.

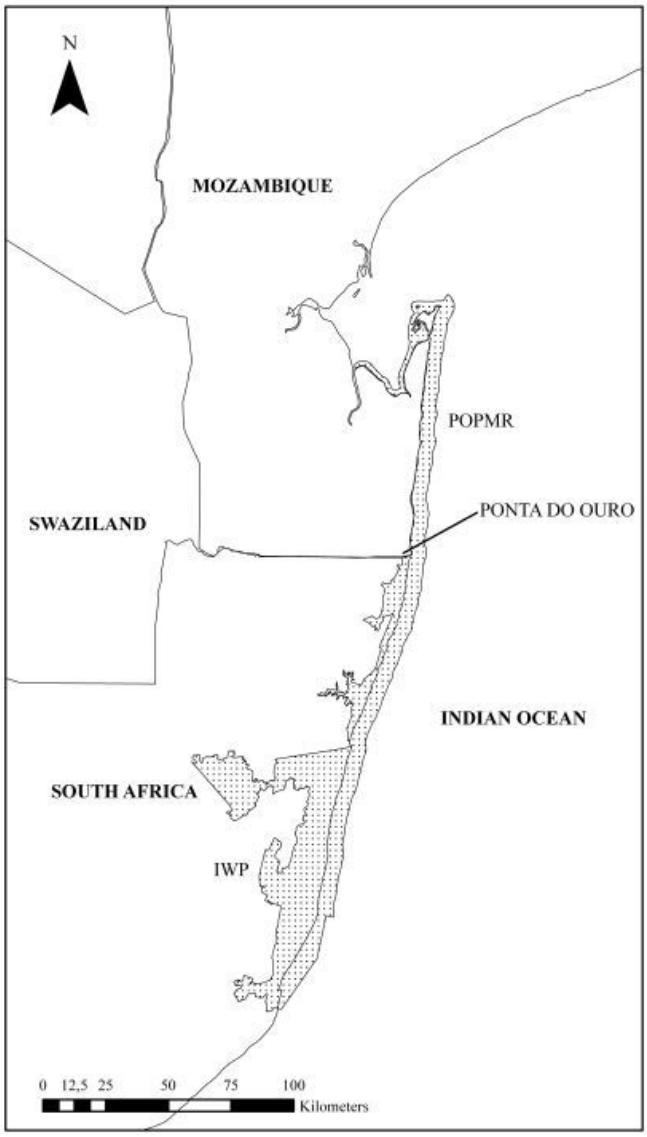


Figure 2 – Border region between Mozambique and South Africa (Source: Ponta do Ouro Partial Marine Reserve). Description: shaded areas indicate the two MPAs in the region, POPMR – Ponta do Ouro Partial Marine Reserve and IWP – iSimangaliso Wetland Park, and single straight lines indicate each MPA's study site.

Coral reefs are crucial hotspots of marine biodiversity [35], and consequently are commonly used as surrogates for marine biodiversity conservation in tropical marine environments [36], such as the coastal waters of the Western Indian Ocean. Coral reefs are threatened by overfishing [37], the use of destructive fishing gear [38], land-based pollution [39], climate change [40], and tourism [41]. Despite being particularly vulnerable [42], coral reefs usually react positively to increased and prolonged protection through the creation of MPAs [43].

Indo-Pacific humpback dolphins are one of the best studied cetaceans in the Western Indian Ocean [44], but knowledge of this species is restricted to very few local populations. They are protected internationally by the Convention on Migratory Species (CMS, Appendix II) and by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Appendix I) [45], and considered Near Threatened by IUCN [46]. Humpback dolphins have a discontinuous distribution throughout their range, and their preference for shallow waters – coral reefs, mangroves, and the murky waters of estuaries – exposes them to intense coastal activities and degraded habitats [47]. They may be protected through the creation of MPAs but, as with other marine mammal species, their adequacy depends on the behavior of local populations and threats posed to them [48].

2.3 Methodology

Information about the ecological aspects, threats and institutional arrangements in place for coral reefs and humpback dolphins in the two study areas was initially obtained through literature review. Ecological aspects concern information such as the area covered by or where the resource is found, biophysical factors affecting their occurrence, and their condition. Threats to the resources are those activities which inherently deteriorate the resource condition, or that are conducted at such levels as to result in serious damage. Institutional arrangements refer to both informal and formal rules governing resources and the activities that threaten them.

Fieldwork was then conducted inside the existing MPAs, consisting in participant observation and questionnaires with resource users and tourism operators, and in semi-structured interviews and informal conversations with key informants (fisheries officials, MPA managers, researchers, environmental NGOs). One community in each MPA was visited, except in IWP. Consequentially, studying how marine resources are currently

managed inside each MPA was crucial to gain a better understanding of (i) the consequences for underprotected areas of a future increase in marine environmental protection, and, to some extent, (ii) how existing MPAs may be impacted by linking them through transboundary cooperation. The former was particularly relevant for the Mozambique-Tanzania case study, where there is a significant area without protection between MBREMP in Tanzania and QNP in Mozambique. The multitude of sources allowed the triangulation of information and strengthened its consistency and reliability. Yet, there are still important gaps in knowledge that will also be addressed in the following sections.

3. MOZAMBIQUE-TANZANIA TRANSBOUNDARY REGION

3.1 Coral reefs

3.1.1 Ecological aspects

Coral reefs form an almost continuous fringing reef along the 425 km of coast of Mozambique's northern coastal province, and have an area of about 20 km^2 along the coast of southern Tanzania [49, 50]. They are subjected to the influence of the westward South Equatorial Current. After crossing the Indian Ocean, this current meets the land around the border between Mozambique and Tanzania, splitting into the northwards Southwest Monsoon drift and the southwards Mozambique current [51]. The exact point where the South Equatorial Current splits into those two opposing currents is variable, making it impossible to know whether coral reefs on the Tanzanian side are sinks and those in Mozambique sources, and vice-versa. Though research on coral reefs in this transboundary region is limited, it has been suggested that coral diversity in the Western Indian Ocean is at its highest here [52]. However, coral reefs and associated fish populations show signs of deterioration from intensive fishing activity and from the use of destructive fishing methods [49].

3.1.2 Threats

Coral reefs in this region experienced very high levels of mortality during the 1998 El Niño event [53, 54]. However, they are among the most resistant to warming events in the Western Indian Ocean [55], and have been making a good recovery [56, 57]. Coral reefs

in this region are used for various purposes, some of which pose serious threats to their condition and existence.

Population growth is believed to be the main factor behind overfishing on both sides of the border, which in the case of Mozambique may be further compounded by the permanent settlement on the coast of inland people that were displaced by independence and civil wars. The coastal population in this region faces extreme poverty, and generally has in marine resources its main source of animal protein, thus less accessible reefs have less signs of fishing activity [58].

In addition, authorities and coastal communities in Mozambique suggest that overfishing on the Mozambican side is also caused by migrant fishers coming from Nampula, further south, and from Tanzania [59]. The presence of Tanzanian fishers in the Quirimbas archipelago has also been attributed to the creation of MBREMP, through displacement of fishing effort [59, 60].

It is general belief in the region that the use of destructive fishing gears in northern Mozambique has resulted from the presence of migrant fishers. Of particular concern is the use of dynamite for fishing, which has been common in Tanzania since the 1960s and prohibited since 1970. A nation-wide campaign during 1998 was able to almost eliminate it [61], but discontinuation of enforcement efforts is believed to have eased its resurgence, including recently inside MBREMP. There are anecdotal reports of dynamite fishing being now used too in northern Mozambique. Other drivers of degradation of coral reefs and associated communities are the use of beach seines and intertidal gleaning in reefs with low coral growth [62], and the use of Euphoria and cattle insecticide to stun reef fish, both practices posing public health problems. In addition to being important fishing grounds, coral reefs are also mined for building material and raw material for lime production. Regrettably, coastal communities do not usually see this traditional practice as harmful.

There are expectations that tourism will contribute to the financial sustainability of the MPAs in this region and provide employment opportunities for locals. Yet, tourism is nearly inexistent inside MBREMP. In northern Mozambique, both inside and outside QNP, tourism activities target higher market segments, remain low intensity, and provide few job opportunities mostly limited to unskilled labour. Consequently, and at its current levels, tourism is hardly a threat to coral reefs, and future rampant growth is unlikely

given the difficulties in accessing the region and its inability to compete with similar destinations that are more accessible and less expensive (e.g., Zanzibar in Tanzania, Bazaruto in Mozambique).

In contrast with tourism, oil and natural gas exists in this transboundary region, and prospecting and exploitation is likely to seriously affect coral reefs. In northern Mozambique, and as of August 2010, deposits had been found at great depths, but their commercial viability remains unknown. In Tanzania, there is a natural gas field currently exploited inside MBREMP. The pipeline connecting the gas field to a processing facility 40 km away avoids coral reefs, but future expansion of exploration is likely and commercially promising [63].

3.1.3 Institutional arrangements

Coral reef-related marine uses in the two countries are subjected to various regulations, but this habitat remains open access. In Mozambique, coral reefs are considered "fragile ecosystems" and therefore any activity that damages them is prohibited (2006 Regulation for Pollution Prevention and Protection of the Marine and Coastal Environment), while in Tanzania regulations concern activities in general (e.g., 2003 Fisheries Act) and do not address coral reefs in particular.

In both MBREMP and QNP, coral reefs are protected through gear restrictions and zoning schemes regulating marine and coastal activities. The zoning scheme in MBREMP does not appear to be adequately complied with or enforced [pers. obs., 62]. In QNP, several sanctuaries (i.e., no-take areas) have been created, most in areas with coral reefs. The use of prohibited gears is somewhat tolerated in both MPAs due to lack of alternatives.

Besides MPAs, coral reefs in both countries are also targeted by fisheries co-management arrangements promoted by their respective state administrations. In Tanzania, Beach Management Units (BMUs) are being created along the Indian Ocean coast, except inside MPAs. BMUs are promoted by the central government in collaboration with local authorities. Fishers have a strong incentive to join a local BMU, as otherwise they cannot be issued fishing licenses. BMUs provide a useful platform for localized and participatory fisheries management, but they have limitations. BMUs appear to be more an extension of government than a true partnership between government and fishers, as input from fishers is hardly ever sought [64]. Furthermore,

other stakeholders besides fishers (e.g., fish processors, traders, gear repairers and suppliers, boat builders) can also join a BMU. This can be counter-productive, as BMUs are often dominated by traders [65], replicating some of the power relations that impede fishers from improving their livelihoods [66].

In Mozambique, Community Fisheries Councils (locally known as CCPs, from the Portuguese designation Conselho Comunitário de Pesca) are being created throughout the entire coast, including inside MPAs such as the marine section of QNP. Similarly to BMUs, CCPs are jointly promoted by central and local authorities, at times with support from other organizations. For example, some CCPs inside QNP are promoted and facilitated by a local NGO, and others by QNP itself. CCP members, like BMU members, are responsible for managing access and resource extraction from a designated marine area, and this includes regulating access by outsiders, particularly migrant fishermen. However, BMUs and CCPs, like other marine resource-related policies in the region, do not adequately address the issue of migrant fishermen [67].

Other regulatory measures affecting coral reefs, both inside and outside MPAs in the two countries, include the duty to conduct environmental impact assessments for potentially damaging activities, such as seismic surveys, drills, and pipelines. In what concerns tourism activities, both MPAs have recently increased their fees for tourism operators without notice. This has resulted in MBREMP's only tourism operator ending its activities, while in QNP it is generally perceived as discouraging by investors.

3.2 Indo-Pacific humpback dolphins

3.2.1 Ecological aspects

To date, humpback dolphins in this region have been poorly studied. The only official sightings in this part of Mozambique have been reported in the Environmental Impact Assessments of seismic surveys conducted for the concession block bordering Tanzania [68, 69], and by an international research project recently conducted in the region [70]. These sightings confirmed previous perceptions that, in northern Mozambique, humpback dolphins prefer the shallow and calm waters between the Quirimbas islands and the mainland [23]. Personal observations of humpback dolphins near Ibo Island within QNP further add to the scarce information available.

Humpback dolphins are also found in southern Tanzania, but their numbers appear to be smaller than in northern Mozambique where most fishers easily recognised the species, in contrast with fishers in southern Tanzania. There is no information available regarding transboundary movements of the species, but given the continuity in habitat (i.e., calm, shallow waters including those of the Ruvuma estuary), it is very likely that individuals straddle the border between Mozambique and Tanzania.

3.2.2 Threats

Humpback dolphins can easily be caught in fishing nets as bycatch, particularly shark nets, as they are slow simmers. It is not clear how many individuals may be caught over a certain period of time, but some of them are not released so they can be used as bait for shark fishing in Tanzania. As one fisher explained, this preference for humpback dolphins is justified by their flesh being bloody, hence good to attract sharks. This preference for humpback dolphins for shark bait in Tanzania is a reason for concern. Artisanal fisheries, in contrast with commercial fisheries, are responsible for most shark catches, and southern Tanzania is one of the mainland regions where shark fishing is more intense [71]. There is anecdotal evidence of humpback dolphins being used for human consumption outside QNP and close to the border with Tanzania. There are no tourism activities associated with marine mammals in this region, except for the occasional sighting by the few tourists that scuba dive or snorkel in northern Mozambique.

3.2.3 Institutional arrangements

Like coral reefs, humpback dolphins are also open access in Mozambique and Tanzania. The entire Indian Ocean was declared a marine mammal sanctuary by the International Whaling Commission in 1979, hence prohibiting commercial whaling in areas less than 55°S. Mozambique prohibits the catch of all dolphin species by sport and recreational fishers (Sport and Recreational Fishing Regulation, Decree 51/99 of 31 August 1999). According to fisheries and marine conservation officials and specialists in Mozambique, this is implied to be applicable to any kind of fishery. Inside QNP, there is no specific concern with dolphins, besides the one expressed in the Management Plan that determines that marine mammals are not to be approached within 100 meters [72]. In Tanzania, there are no regulations that protect humpback dolphins, directly or indirectly.

4. MOZAMBIQUE-SOUTH AFRICA TRANSBOUNDARY REGION

4.1 Coral reefs

4.1.1 Ecological aspects

Coral reefs in this border region are the southernmost corals in Africa, cover an area of 5 km^2 [73] in southern Mozambique and less than 50 km^2 in South Africa [74], and are considered to be in very good condition [75, 76]. Coral reefs on both sides of the border lack most characteristics of true coral reefs [76, 77]. They are located very close to the coast, as a result of the narrow continental shelf, and under the influence of the Agulhas current [73]. Its highly stable southward trajectory implies that coral reefs in South Africa are seeded by those in southern Mozambique. Reef fish tagging studies have been conducted on both sides of the border, and suggest MPA size ranges of 1.9-91.2 km for resident and semi-resident species [78]. This transboundary region's purported upstream importance for some of South Africa's fisheries [79], its high levels of coral reef endemism and the threats posed to them make this region a top marine biodiversity hotspot that should receive priority conservation measures [80].

4.1.2 Threats

Coral communities in the Mozambique-South Africa transboundary region were the least affected by the 1998 bleaching event in the Western Indian Ocean [55]. Because of their high-latitude location, they are expected to experience minimum bleaching in further warming events [81, 82]. Hence, direct human activities, such as scuba diving and fishing, are a more likely source of harmful disturbance.

Recreational scuba diving is a very popular activity on both sides of the border. The general perception among tourism operators and MPA managers is that diving is more intense on the South African side, than on the Mozambican side. In 2009, there were at least seventeen scuba diving companies in IWP, with up to 35 probably operating there in the near future, while in POPMR there were at least nine operators. Diving pressure is concentrated on the near shore shallow reefs on both sides of the border [83, 84]. Coral communities in Sodwana Bay, the most popular diving spot in IWP and South Africa, received 80.000 dives in 1999 [85], and 67.900 dives in 2009 [86], a decline attributed to the growing popularity of southern Mozambique as a diving destination and, more recently, to the economic downturn. In POPMR, coral communities received an estimated 62.000 dives in 2002 [83], but less than 25.000 in 2010 (M. Pereira, pers. obs), a decline that is attributed not only to the economic downturn but also to competition

from other domestic tourism destinations (e.g., Inhambane). In agreement with a general perception of diving pressure being higher in IWP than in POPMR, key informants in both countries agree that coral communities in POPMR are in better condition than in IWP. Damage by new divers in both MPAs and by underwater photography competitions in IWP are particular reasons for concern [85]. Damage from boat anchoring is not an issue as it is prohibited and very difficult due to the prevalent large swells.

Fishing in this region is essentially a sport/recreational and commercial activity, as subsistence fishing is limited to shore angling due to rough sea conditions that impede the use of non-motorized boats. Sport/recreational fishing in or near coral communities in POPMR and IWP consists in spear fishing, jet ski angling, shore angling, and more recently also involves deep-water sport fishing from motor boats, with all modalities targeting both reef and non-reef fish species [30, 87]. In POPMR, spear fishing is done opportunistically by a small proportion of divers [83], and by local employees of diving companies while their clients are diving (pers. obs.). Shore anglers are both tourists and locals. The impacts of recreational fishing here are unknown, though the diving community complains of damage to coral communities and reef fish populations from fishing lines and hooks. A commercial reef line fishery exists on the Mozambican side, though boats are only licensed to fish to the north of Ponta Dobela. Illegal fishing to the south of Ponta Dobela occurs – but reports on its intensity and location are contradictory – and extend into South African waters. Coral communities seem not to be affected, though there are concerns that reef fish may be impacted [87].

In IWP, recreational fishing, notably shore angling, has decreased as a result of the 2001 beach driving ban [88]. It is still a very popular activity in IWP, essentially restricted to two public boat launching sites, and with regular fishing competitions [89]. Estuarine and shore anglers do not pose a threat to reef fish as almost the entire catch is released. The situation is very different for jetski anglers and spear fishers, as the former release a rather small proportion of their catch, and the latter catch non-pelagic, residential species with great effectiveness [89]. This places spear fishing as the main source of concern, similarly to coral reefs elsewhere [90, 91], for its removal of reef's top predators. Fishing lines from other recreational fishing activities also damage corals, and though it is a rather small source of damage, it can have serious consequences [84].

4.1.3 Institutional arrangements

Coral reef-related marine uses in this border region are very similar, but they are subject to significantly different regulations that are imposed either at the MPA or national and provincial levels.

In Mozambique, the scuba diving regulatory regime does not seem to be fully adhered to by both operators and authorities. There are no limits to the number of scuba diving operators on the Mozambican side. POPMR's management plan proposes a zoning scheme similar to IWP's whereby scuba diving is allowed in the restricted and multiple use areas, but not in the sanctuary area [30]. Current diving areas may be closed and/or new ones created to spread diving pressure [30]. Most scuba diving operators purport to adhere to standard environmental guidelines ("no touching, no teasing, no taking"). Their concerns with the need for healthy coral communities as a pre-condition for business success, and the establishment of POPMR, lead to the creation of the Ponta do Ouro business association. Their membership and scope is expected to increase with growing local tourism supply, and the approval of POPMR's management plan. Similarly to scuba diving, fishing of pelagic species only is allowed in the restricted and multiple use areas for permit holders [30]. The use of jet skis, which disturbed and endangered bathers, is restricted to fishing permit holders.

On South Africa's side, uses associated with coral reefs are under a clear regulatory regime that is adequately enforced, a direct consequence of all coral reefs being found in MPAs [92]. Formally, coral reefs have been protected since 1986 through national and provincial legislation [93]. At the IWP level, the joint management plan of Saint Lucia and Maputaland Marine Reserves, which cover the northern and central sections of IWP's marine environment, are applied in the absence of the Integrated Management Plan required by World Heritage sites [94]. The management plan of the two MPAs is not legally binding [95], but the zoning scheme is widely recognized, complied with, and enforced. It consists of sanctuary zones, restricted zones, and controlled access zones. Scuba diving is allowed in restricted (advanced divers only) and in controlled access zones, and subjected to diving permits. A sandy area surrounding one of the small "reefs" is used for buoyancy training of novice divers, leaving the "reef" in better condition than others [84]. Besides this informal arrangement, there is no specific zoning of "reefs" for scuba diving [74] nor limits to number of dives. Like in POPMR, scuba diving operators in Sodwana Bay (the main scuba diving launching site in IWP) have also constituted a local business association that promotes training of staff (pers.

obs.). Operators claim to adhere to standard environmental practices in their activity. Fishing is also permitted in restricted and controlled access zones, as long as the catch consists of pelagic species only. It should be noted that the sanctuary zone in the northern section of IWP borders with the controlled access zone in the southern section of POPMR, and that there is no maritime boundary delimited between the two countries.

4.2 Indo-Pacific humpback dolphins

4.2.1 Ecological aspects

This transboundary region lies between two of the areas where humpback dolphins have been most studied in Africa: Maputo Bay to the north of POPMR, and most of South Africa's coast. In Maputo Bay, the population is estimated at 105 individuals [96]. The eastern section of the Bay – constituting the northern section of POPMR – appears to be a preferred area for foraging and nursing, besides receiving transient individuals seasonally [96]. In Ponta do Ouro, a few individuals are regularly seen, often associated with a pod of bottlenose dolphins.

In KwaZulu-Natal, there an estimated 165-215 individuals [97], which prefer large estuaries and enclosed bays [47, 98], such as Saint Lucia estuary and Kosi Bay inside IWP. This preference may be because of these estuaries' calm waters providing some shelter from the big swells found along South Africa's coast, or could be a dietary preference for estuary fish [98]. Humpback dolphins in Richard's Bay – located less than 50 km to the south of iSimangaliso Wetland Park – are the best studied in the country. Resident humpback dolphins travel up to 150 km from here [99]. It has also been suggested that humpback dolphin densities are higher to the north of Richard's Bay, and that the local population may receive individuals migrating from further north [100].

Populations in both locations experience seasonal changes in composition [96] that suggest transboundary movements to occur.

4.2.2 Threats

Humpback dolphins in this transboundary region are subjected to several threats, most notably land-based pollution. They have the highest concentration of organochlorines among marine mammals in South Africa [101], probably a direct consequence of intense pesticide use in sugar cane plantations affecting estuaries [102]. The use of DDT to eradicate malaria in the northern part of KwaZulu-Natal may have also contributed to

contamination of humpback dolphins [101]. The most direct consequence of contamination is females transferring 72-85% of pollutants to their calves [103], which explains the very high mortality rates among first-born calves [104]. Reductions in the input of these contaminants in the marine environment may take many years to be reflected in the level of contaminants of small marine mammals [105]. In KwaZulu-Natal, pollution levels may take even longer to decrease because of its level of industrialization and agriculture production [101]. Another threat to humpback dolphins on the South African side of the border comes from antishark nets deployed to protect bathers from shark attacks [100]. Antishark nets are found along the main beaches in KwaZulu-Natal, but not inside IWP. The nearest location is in Richard's Bay [99], where in the 1980s they caught the highest share of all humpback dolphins captured in this way in South Africa [100]. Antishark nets are a very serious threat to humpback dolphins because the mortality levels inflicted (4%/year or 7,4 individuals/year) is similar to the theoretical annual population growth rate (4-6%) [100]. In an effort to reduce bycatch, antishark nets have been being replaced by drumlines, while others have been equipped with pingers. Drumlines have significantly less bycatch than antishark nets. Pingers set on these nets have not produced any reduction in humpback dolphin mortality [106]. Against the backdrop of these threats, incidental sightings of humpback dolphins by the KwaZulu-Natal Sharks Board declined 50% between 1984 and 1992, suggesting a reduction in the population size in the province [97].

In southern Mozambique, the main threats to humpback dolphins result from fishing activity, both commercial and artisanal, in Maputo Bay. There is no indication of this species being subject to any threat in the Indian Ocean section of POPMR, probably a result of their near shore and shy behaviour resulting in boat avoidance of both fishing vessels and dolphin-watching boats operating from Ponta do Ouro. The two dolphin-watching operators in POPMR follow strict codes of conduct in their interactions with dolphins, and are an unlikely source of significant disturbance. Scuba diving operators that allow their clients in the water when dolphins are spotted on the way back to shore are more concerning.

4.2.3 Institutional arrangements

Humpback dolphins are an open access resource in both Mozambique and South Africa. Inside POPMR, humpback dolphins are not a conservation priority, given their small

numbers, the absence of a perceived, strong threat, and lack of tourism appeal. Dolphin-watching activity will be strongly regulated through the POPMR management plan, which allows only one dolphin-watching license for every 20 km of coast. Commercial fishing is not allowed inside POPMR, so interactions with fishing vessels will likely be reduced. In IWP, the only whale-watching operator may soon be joined by two others, following the national government's request for applications. The regulatory regime for whale-watching defined in the 2008 Regulations for the Management of Boat-Based Whale Watching and Protection of Turtles sets out very clear guidelines for the behaviour to be adopted by tourism operators.

4. DISCUSSION

The previous section showed how the ecological characteristics of coral reefs and humpback dolphins, as well as the threats and institutional arrangements to which they are subjected to, can vary from one region to another. These cross-site differences have important implications for the proposed transboundary MPAs.

Firstly, and in what concerns the ecological characteristics of marine resources, the lack of mobility of coral reefs implies that area-based tools such as MPAs are appropriate for their conservation. The influence of currents on larval connectivity between coral reefs needs however to be taken into account [107], and connectivity studies are needed to provide important information for sitting no-take areas within the proposed transboundary MPAs [108]. In the case of humpback dolphins, the continuity in habitat and depth preferences [109] suggests that humpback dolphins can be protected through an MPA in the Mozambique-Tanzania border. The same does not apply to the Mozambique-South Africa border where that continuity is lacking. However, and even for the Mozambique-Tanzania border region, the lack of knowledge on the ecology and population dynamics of this species deters any further elaborations on the adequacy of MPAs for its protection or even on how it compares with other conservation tools.

Secondly, the threats to the two resources pose particular challenges to the proposed transboundary MPAs. Coral reefs in the Mozambique-Tanzania border region are particularly threatened by subsistence fisheries, through overfishing and destructive fishing methods, and by oil and gas prospection and exploration. The dietary needs of coastal communities in the region, which are significantly met through fishing, strongly support the need for a sustainable use approach to coral reef conservation (in contrast

with a purely conservationist one). The difficulties in managing fishing effort by migrant fishers strongly suggests that the empowerment of local communities that fisheries co-management institutions are promoting may be a more adequate vehicle to deal with outsiders' fishing effort. Also, oil and gas prospecting and exploration activities in this region can inflict physical damage to coral reefs and associated species from seismic surveys and drilling, and chemical contamination from spills. In the Mozambique-South Africa region, threats to coral reefs arise essentially from reef-based tourism, that is, they result directly from reef-based activities and not from activities somewhere else. Consequently, MPAs can provide an adequate framework for their protection. In the case of humpback dolphins, non-disturbance in preferred habitats in the Mozambique-Tanzania border can be achieved with area-based tools such as MPAs, as has been done with sea turtle conservation efforts focused on their nesting sites [110]. Still, the bycatch of humpback dolphins can only be reduced through fisheries management tools that are not area-specific, which has also been recognized for sea turtles where bycatch reduction is crucial for their protection [111, 112]. In the Mozambique-South Africa region, MPAs are inadequate to deal with land-based pollution [20] and to reduce impact by anti-shark nets, essential for bather safety. They could however entail measures to reduce boat traffic and noise [109] that results from water-based tourism activities.

Thirdly, existing institutional arrangements need to be taken into account, and harmonized with the regulations of future MPAs. In the case of coral reefs, environmental impact assessment procedures related to oil and gas prospecting and exploration can complement MPA regulations, and even present stricter environmental standards inside MPAs. Yet, higher environmental standards will not avoid damage, in the same way that oil and gas prospecting and exploration are very unlikely to be halted altogether. As an alternative to the harmonization of existing regulations with future transboundary MPA regulations, existing institutional arrangements may be considered as a viable tool for coral reef conservation instead of MPA creation. In the Mozambique-Tanzania region, and despite their weaknesses, fisheries co-management institutions may provide a more adequate arrangement to deal with threats to coral reefs arising from fishing practices, for four reasons. First, CCPs in Mozambique and BMUs in Tanzania are co-management approaches that can empower local communities to address their problems. Second, CCPs and BMUs have a focus on sustainable use in a context where marine protein is essential for local communities, increased fishing pressure resulting from fishing effort

displacement is believed to occur, and protection from outsiders is more important than conservation *per se*. Third, CCPs and BMUs rely greatly on local capacity in very populated region of the two countries, hence potentially making the administrative and management structure of new MPAs redundant, and enforcement difficult in face of the region's remoteness. Finally, local communities have shown great ambivalence regarding MPAs [59]. Taken altogether, these reasons are at least supportive of the need to consider alternatives to MPAs for the conservation of coral reefs in the Mozambique-Tanzania border region. In the Mozambique-South Africa region, the regulations of South African MPAs appear to be sufficient to deal with the existing threats from tourism activities. Further improvements may be necessary to better control the impacts of spearfishing and underwater photography, and to address the issue of the undelimited maritime boundary. The latter hinders the fight against illegal commercial fishing because authorities cannot clearly identify their jurisdiction. It also makes it impossible to discern where POPMR's controlled access zone ends and the IWP's sanctuary zone begins. In relation to humpback dolphins, Mozambique and Tanzania lack rules to protect them inside and outside MPAs, so a new transboundary MPA would need to fill this vacuum. In South Africa, very concrete and targeted actions have been taken, namely on the need to reduce bycatch by anti-shark nets. In the Mozambique-South Africa border region, the existing MPAs have at best a negligible effect on humpback dolphin protection, as they cannot control land-based pollution. Consequently, these MPAs should be placed within larger ocean management governance frameworks that account for the impact of land activities on marine biodiversity [20].

Finally, and in relation to the existing MPAs, it is clear that in the Mozambique-South Africa region the joint management of the existing MPAs is a logical consequence of their contiguity. This contrasts greatly with the Mozambique-Tanzania case, where 200 km separate the two existing MPAs.

5. CONCLUSIONS

This research has shown that ecological characteristics, threats and institutional arrangements of vulnerable marine resources provide a framework against which the adequacy of proposed MPAs to protect those resources can be assessed before MPAs are actually created. The examination of these aspects brings into question the adequacy of transboundary MPAs to protect coral reefs in the Mozambique-Tanzania border and

humpback dolphins in the Mozambique-South Africa border. It also points gaps in the proposed transboundary MPAs regarding the protection of humpback dolphins in the Mozambique-Tanzania border region and of coral reefs in the Mozambique-South Africa region. In particular, this research has highlighted the multiple use contexts in which transboundary MPAs are being proposed in the border regions between Mozambique and Tanzania, and between Mozambique and South Africa, as well as the institutional arrangements that already exist.

Most importantly, though, this research has demonstrated that social and institutional context is crucial to the planning of MPAs, transboundary or subnational, in the Western Indian Ocean and elsewhere. It seems appropriate then to suggest that marine management interventions for conservation purposes, such as MPAs, require not only an evaluation of their adequacy in face of particular contexts, but also against other management interventions, such as existing fisheries co-management institutions [113]. Finally, we should keep in mind that there are no perfect marine conservation tools and that us all – MPA researchers, policy-makers and managers – should be aware of their limitations and advantages.

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5. MPA GOVERNANCE: A COMPARISON

Chircop, A., Francis, J., Van Der Elst, R., Pacule, H., Guerreiro, J., **GRILO, C.** & Carneiro, G. (2010). Governance of Marine Protected Areas in East Africa: A Comparative Study of Mozambique, South Africa, and Tanzania. *Ocean Development & International Law*, 41(1), 1 - 33.

Abstract: Marine protected areas (MPAs), including MPA networks, have become an indispensable tool for marine conservation. This article undertakes a comparative discussion of the domestic governance frameworks of Mozambique, South Africa, and Tanzania in view of the efforts of these three states to scale up their MPA cooperation in the East African Marine Ecoregion (EAME) to include MPA networks, including transboundary MPAs. Although on many issues there appears to be regional solidarity and convergence on principles, including participatory processes and decision making to guide MPA making, there are significant differences on lead roles, institutional structures, access to public information, and conflict management, among others, which would need to be factored in MPA cooperation. Other important factors for regional MPA cooperation include policy directions on shared concerns such as conservation and development values with emphasis on equitable resource use and poverty alleviation.

Keywords: East Africa, marine protected area, Mozambique, South Africa, Tanzania

1. INTRODUCTION

States parties to the 1992 Convention on Biological Diversity (CBD)[i] committed through a 2004 decision of the Conference of the Parties (COP) to achieve effective protection of 10% of marine ecoregions by 2012.[ii] Wells, Burgess, and Ngusaru (2007) recently reviewed the status of marine protected areas (MPAs) in East Africa and reported considerable progress concerning protection of the continental shelf. They suggested that Kenya, Mozambique, and Tanzania could reach their target commitments by 2012. South Africa has also been reported as achieving significant progress, with designations of as many as 20 MPAs (South Africa 2008). However, as Wells, Burgess, and Ngusaru (2007) noted: “There is a risk that focusing on increasing the area under protection could have a negative impact in terms of reducing management effectiveness of existing MPAs” (at

80). In other words, there is a danger that, while pressure to meet the CBD target percentage mounts, states might not meet the corequirement of effective management.

In addition to domestic MPA initiatives, regional initiatives to establish MPA networks are needed in response to the 2002 World Summit on Sustainable Development's call for a global system of MPA networks[iii] and also to further assist meeting the CBD target for marine ecoregions (Fifth World Parks Congress 2003; World Conservation Congress 2008; World Summit on Sustainable Development 2002). There is growing attention on the need for greater transboundary marine conservation efforts in the East African Marine Ecoregion (EAME). The United Nations Environment Programme (UNEP) Regional Seas Programme for East Africa has a 1985 Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region,[iv] the implementation of which is overseen by a Group of Experts on Marine Protected Areas in Eastern Africa (GEMPA-EA). The World Wildlife Fund (WWF) established the EAME program that aims at 10% of each state's marine area to be under MPA cover and to which South Africa and Tanzania have made commitments (WWF 2004). There is growing awareness among East African states of the need to adopt a systemic approach to MPA designation and management in the interests of conservation of the EAME which they all share (UNEP/WCMC 2008, at 57). There is already interest in transboundary MPAs.[v] A systemic approach to protecting the EAME necessarily involves the use of tools such as MPA networks and transboundary MPAs covering substantial areas of the coastal and maritime zones of regional states.

Clearly, regionalism of this type requires a high degree of bilateral and multilateral cooperation in undertaking, coordinating, and implementing MPA-making commitments. An essential aspect of MPA making at the national level (and at any level for that matter) is the governance framework; especially, a solid domestic legal foundation to support MPA establishment and management (Kelleher 1999; Pomeroy, Parks, and Watson 2004; Sanders and Cochrane 2006). Where MPA cooperation has an international dimension, such as in the case of a transboundary MPA, the governance framework needs to include a bilateral or coordinated legal arrangement (Kelleher 1999). A proper domestic and bilateral governance framework provides legitimacy and is the springboard for planning, implementation, management, and enforcement—all essential elements of effectiveness.

This article undertakes a comparative discussion of the domestic governance frameworks of Mozambique, South Africa, and Tanzania in view of the efforts of these three states to scale up their MPA cooperation in the EAME to include MPA networks, including transboundary MPAs. The geographical focus is on two areas in the border regions between Mozambique and Tanzania and Mozambique and South Africa (see Figure 1). More specifically, the discussion is guided by two critical questions: (1) Given the prospect of international MPA cooperation in their border regions, are their respective governance frameworks coherent and sufficiently in harmony to facilitate cooperation? and (2) Are there gaps in those frameworks and, if so, what are they and could they constrain transboundary MPA cooperation?

2. COMPARATIVE ASSESSMENT

Although the needs of governance of MPAs are well understood, there is less of a clear understanding of the governance demands of MPA networks, including transboundary MPAs. On the one hand, as long as the MPAs concerned work together to achieve common goals, "the sites do not necessarily have to be managed in the same way" (UNEP/WCMC 2008, at 8). However, principles of good governance for MPA networks have yet to be identified and there are no indicators to measure network success in reducing biodiversity loss (UNEP/WCMC 2008). Clearly, whatever the governance framework of a transboundary MPA, such a framework would be influenced by the respective national governance structures in the cooperating states because of the sovereignty issues involved (UNEP/WCMC 2008).

While being cognizant of the lack of guidance on governance principles, structures, and processes for the establishment of international MPA networks and transboundary MPAs, we assembled a composite analytical framework drawing from the literature on integrated coastal and ocean management (ICOM) and MPAs. MPAs are increasingly considered important tools for ICOM (Cicin-Sain and Belfiore 2006; Ehler 2006). Literature on international relations theory (in particular, regime theory) was also used to consider aspects of the international bilateral relations between the three states. The resulting composite framework includes 12 criteria considered useful for a discussion of comparative governance, and which are used as the basis for comparative analysis.

2.1 Common International Legal Commitments

Determination of the extent to which the three states are parties to the same instruments and members of the same international organizations is important. Prima facie this indicates the presence of convergent and mutual expectations on the accepted international principles, norms, rules, and procedures of the international regimes to which they subscribe (Keohane 1984). Mozambique, South Africa, and Tanzania are parties to important international environmental law instruments relevant or useful for MPA making, but not necessarily to all of them. These instruments can be considered in two categories: (1) instruments that specifically provide for protected areas, and (2) instruments that provide tools that can be used for the management of protected areas.

Under the first category, the three states are parties to the following conventions, which are all in force: the 1971 Convention on Wetlands of International Importance, especially as waterfowl habitats relevant for the establishment of Ramsar sites;[vi] the 1992 Convention Concerning the Protection of the World Cultural and Natural Heritage,[vii] relevant for the establishment of World Heritage sites; the 1982 United Nations Convention on the Law of the Sea (UNCLOS),[viii] which provides for the adoption of special mandatory measures addressing vessel source pollution in special areas in exclusive economic zones (EEZs); and the 1992 Convention on Biological Diversity, relevant for *in situ* conservation.[ix] There are other instruments belonging to this category where the pattern of adherence by these three states is checkered at best. Mozambique is not a party to the 1979 Convention on the Conservation of Migratory Species of Wild Animals,[x] nor the 1995 Agreement on the Conservation of African-Eurasian Migratory Waterbirds,[xi] unlike South Africa and Tanzania. None of the three states is a party to the 2001 United Nations Educational, Scientific and Cultural Organization (UNESCO) Convention on the Protection of the Underwater Cultural Heritage, which recently entered into force.[xii]

Under the second category, the practice of the three states varies even more. The three states are all parties to only two instruments, the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),[xiii] and the 1973 International Convention for the Prevention of Pollution from Ships, as modified by the 1978 Protocol to the International Convention for the Prevention of Pollution from Ships (MARPOL 1973/78)[xiv] relating thereto.

MARPOL sets out global standards for the discharge of a wide range of operational pollution from ships. More significantly for the protection of sensitive marine

ecosystems, MARPOL provides for the designation of special areas within which higher standards can apply for discharges from international shipping of oily residues (Annex I), noxious liquid substances (Annex II), and garbage (Annex V). MARPOL also regulates the discharge of sewage from the nearest land (Annex IV) and emission control areas for certain pollutants released atmospherically (Annex VI). High vessel source pollution standards are beneficial for MPAs located in the midst or in the vicinity of international maritime trade routes, as is the case of East African MPAs. Although all three states are parties to MARPOL, their subscription to the optional Annexes III–VI is disparate.

Whereas all three are bound by mandatory Annexes I and II, subscription to the other annexes is inconsistent. Mozambique and Tanzania are parties to Annexes III to V; although a party to Annexes III and V, South Africa is not a party to Annex IV; none of the three states is yet a party to Annex VI. The consequence is that, although the three states are in a position to secure higher standards for certain types of vessel source pollution, they are not in a position to do so in relation to all vessel source pollution and to implement such standards. Moreover, the three states have not taken steps to secure from the International Maritime Organization (IMO) the designation of EAME marine areas (especially candidates for MPAs) as special areas under those MARPOL annexes to which all three states are parties (in particular, Annexes I, II, and V providing for special area designation). This is unfortunate because the designation of EAME marine areas as zero discharge zones (e.g., for oily wastes and garbage) would provide additional protection for marine species and marine avifauna vulnerable to these types of pollution.

Unlike South Africa, Mozambique and Tanzania are not parties to several other international instruments that are important for ocean management and MPAs. Considering the presence of a variety of cetaceans in the EAME region, the nonsubscription to the 1946 International Convention for the Regulation of Whaling[xv] stands out. They are also not parties to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (as amended) (the London Convention).[xvi] The London Convention is potentially useful in controlling various discharges into the marine environment that could have deleterious impact on MPAs. Similarly, only South Africa is party to the International Law Commission (ILC)'s 1997 Convention on the Law of Non-Navigational Uses of International Watercourses,[xvii] which is a useful instrument for the control of upstream discharges in international watercourses that could have downstream coastal zone impact. Inexplicably, South Africa

is not a party to the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation,[xviii] which provides a framework for cooperation in oil spill contingency planning and response, a shared concern of all three states given the location of one of the world's major navigation routes just off their coasts.

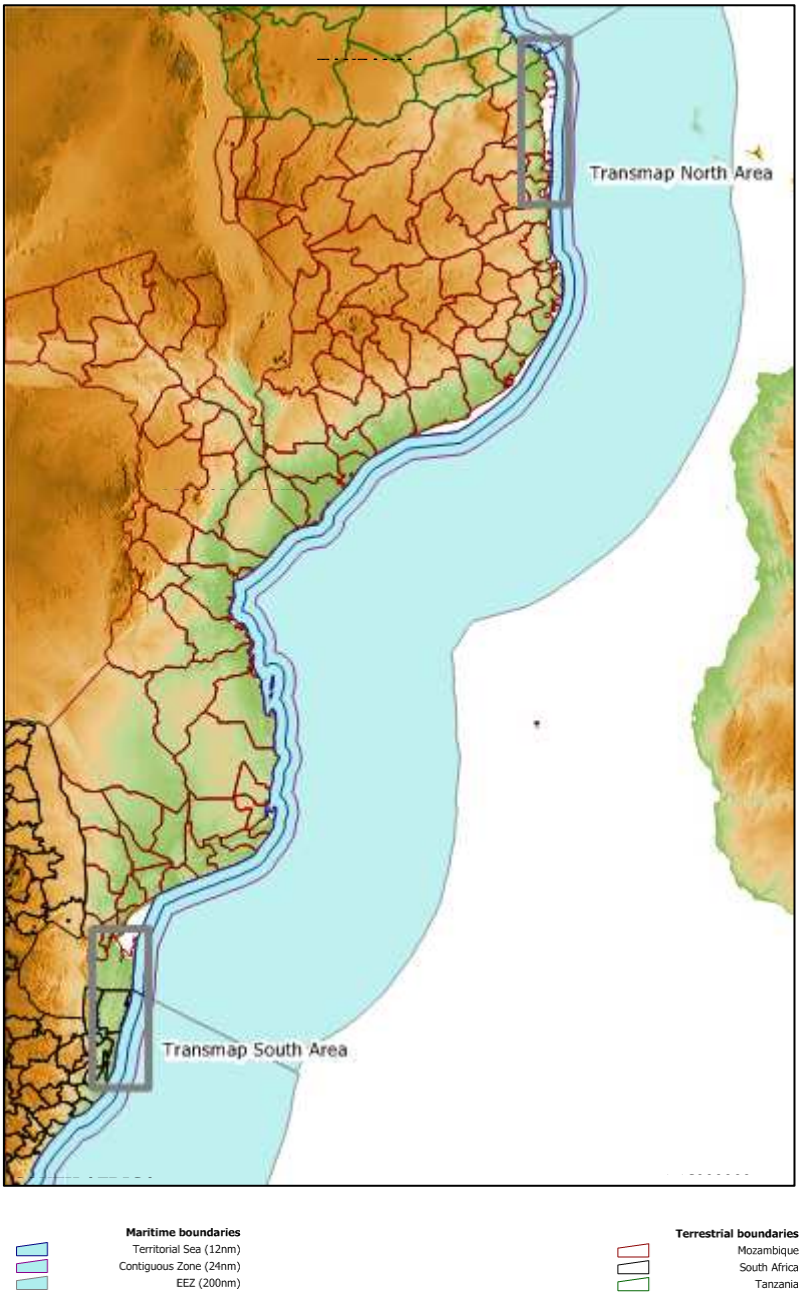

Figure 1 - Transboundary Networks of Marine Protected Areas for Integrated Conservation and Sustainable Development: Biophysical, Socio-Economic and Governance Assessment in East Africa (TRANSMAP) study areas: Mozambique/Tanzania and Mozambique/South Africa border areas.

(*Source:* TRANSMAP, available at http://www.transmap.fc.ul.pt.)

Although there appears to be uniform adherence to key regional political and economic and some environmental agreements, the three states' patterns of ratification of other relevant regional instruments are inconsistent. All three states are parties to the 1985 UNEP Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region[xix] and the 1985 Nairobi Wildlife Protocol.[xx] The three states are parties to the 2000 Constitutive Act of the African Union,[xxi] the 1991 Treaty Establishing the African Economic Community,[xxii] and the 1992 Treaty of the Southern African Development Community,[xxiii] including the latter's Protocol on Wildlife Conservation and Law Enforcement,[xxiv] and the Protocol on Fisheries.[xxv] Support for other important regional environmental and conservation agreements is not as consistent. For example, Mozambique and Tanzania are parties to the 1968 African Convention on the Conservation of Nature and NaturalResources;[xxvi] South Africa is not a party. This instrument was revised in 2003,[xxvii] is not yet in force, and none of the three states is yet a party to the revised convention. While South Africa and Tanzania are parties to the 1994 Lusaka Agreement on Co-Operative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora,[xxviii] Mozambique is not.

At the subregional and bilateral level, all three states have significant experience with domestic marine and transboundary protected areas and resource conservation cooperation with neighbors, albeit mostly in relation to terrestrial parks.[xxix] There are several recent agreements between Mozambique and South Africa (including Swaziland and Zimbabwe) concerning Limpopo transfrontier conservation and resources that indicate experience with the diplomatic and management processes to enable the establishment of this close form of cooperation.[xxx] In 2000 Mozambique, South Africa, and Swaziland adopted the Protocol on the Establishment of the Lubombo Transfrontier Conservation and Resource Area.[xxxi] Five transfrontier conservation and resource conservation areas (TFCAs) have been established, one of which overlaps with the future transboundary MPA area between Mozambique and South Africa. This project establishes the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area. Although there are in effect five TFCAs focusing on different geographical areas under the 2000 Protocol, they are jointly planned and managed by the Trilateral Lubombo Commission. Mozambique has also cooperated with Tanzania in relation to the Niassa-Selous wildlife corridor and with Zimbabwe and Zambia in other transfrontier reserves. The World Bank-funded projects for Mnazi Bay-

Ruvuma Estuary Marine Park and Quirimbas National Park provide further experience more directly related to the transboundary MPA candidate area between Mozambique and Tanzania. South Africa has transboundary park agreements with Botswana concerning the Kgalagadi Transfrontier Park[xxxii] and Namibia on the |Ai-|Ais/Richtersveld Transfrontier Park.[xxxiii]

The three states have other bilateral agreements with neighboring states addressing resources and environmental concerns shared across boundaries. There are several commissions that are tasked with the joint management of international watercourses and river basins to which the three states are party, including: the Incomati-Maputo Agreement between South Africa, Mozambique and Swaziland;[xxxiv] the Orange-Senqu Commission concerning South Africa Botswana, Lesotho and Namibia; the Pungwe River Basin water commission between Mozambique and Zimbabwe; the cooperative arrangements between Tanzania and its neighbors in relation to Lakes Malawi/Nyasa, Tanganyika, and Victoria; and the ongoing work on the establishment of the Zambezi River Basin commission involving eight countries, among which are Tanzania and Mozambique. All three states are signatories to the 2000 South African Development Community Revised Protocol on Shared Watercourses.[xxxv]

The relevance of subregional or bilateral transboundary cooperation agreements lies in the experience that the three states have accumulated from the establishment and management of permanent transboundary resource conservation arrangements with their neighbors. Although the transboundary conservation cooperation experience is fundamentally terrestrial, there is some similarity in the political, diplomatic, legal, institutional, and management challenges to be encountered in the establishment of transboundary MPAs. Most importantly, the extensive diplomatic experience outlined above is evidence of political commitment by the three states to further cooperate on transboundary conservation.

2.2 Implementation of International Legal Commitments

Where the three states are parties to the same international instruments, each state is expected to exercise its rights and duties within those regimes by implementing its protection and conservation-related commitments at the national level. Implementation is expected to occur through a range of measures, including policy change, institutional development, legislation, allocation of resources, and so forth (Mann Borgese, Chircop,

and Pereira 1990). In particular, attention needs to be paid to the application of important generally accepted principles governing sustainable development, ecosystem-based management, participatory approaches, and precaution, among others, that may be considered useful for MPA making. A question to consider is the extent to which the three states adopted a "principled" approach. All three states have formal stated policy, legislated commitments, or both concerning the implementation of international environmental legal obligations and have tended to follow up on those commitments to different extents and in various ways.

Tanzania's National Environmental Policy objectives specifically include the promotion of international cooperation, including bilateral, and implementation of international conventions (TZNEP 1997). Its Environmental Management Act is an important instrument implementing international environmental instruments to which Tanzania is a party (TZ EMA 2004). Similarly, in South Africa, international environmental law not only informs the state's environmental law, but also obligates the state to conform to its international legal obligations (SAMLRA, 1998; SA NEMA 2003, Chapter VI; SA NEMA/ICMA 2008). South Africa has used a range of policy and legislative instruments in implementing its international environmental commitments. For example, the 1972 World Heritage Convention[xxxvi] was incorporated as an annex to the World Heritage Convention Act and iSimangaliso Wetland Park (formerly known as Greater St. Lucia Wetland Park) was designated as a World Heritage site under this instrument (SAWHCA 1999). Mozambique's Environmental Law, though not referring explicitly to international obligations, assumes international cooperation as one of its fundamental principles, recognizing its role in producing solutions to transboundary and global environmental problems (MZ EL 1997). Mozambique's Environmental Law implemented the legal instruments produced by the 1992 United Nations Conference on Environment and Development (UNCED) within 5 years of their adoption.

International environmental law principles, norms, and rules that help guide transboundary MPA making appear in the legislation of the three states. In this respect, the three states appear to be pursuing a principled approach to marine conservation, although their implementation efforts vary. South Africa's National Environmental Management Act is founded on key modern and comprehensive principles that include: sustainable development, a human right to a decent environment, a citizen's legal standing to challenge environmental issues, intergenerational equity, environment as a

public trust, integration, precaution, pollution prevention, the polluter pays principle, local-level governance, ecosystem-based management, and common but differentiated responsibilities (SA NEMA 2003, Chapter I). All of these principles stem from UNCED and other international arenas. The common but differentiated responsibilities principle should be of particular interest to neighboring Mozambique, which is significantly less developed than South Africa, in its joint marine conservation efforts. South Africa's Integrated Coastal Management Act "interests of the whole community" include: "a long-term perspective that takes into account the interests of future generations in inheriting coastal public property and a coastal environment characterised by healthy and productive ecosystems and economic activities that are ecologically and socially sustainable" (SA NEMA/ICMA 2008, section 1). Precaution has a place in the Marine Living Resources Act (SA MLRA 1998). The Biodiversity Act, which implements South Africa's international obligations concerning conservation, provides for ecosystem protection and management and defines bioregions to include the marine environment (SA NEMA/BA 2004, sections 1 and 5). Biodiversity management plans must be aimed to ensure long-term survival of ecosystems and species (SA NEMA/BA 2004, section 45).

Given the recent socioeconomic history of South African fisheries and coastal communities, a balance has had to be struck between development and redistribution of access to resources on the one hand and conservation on the other. South Africa's environmental and fisheries legislation recognizes that poverty alleviation and improving living standards are prioritized goals. Hence, rather than taking a rigid approach to the implementation of international principles, the fisheries legislation attempts to achieve a balance between the need to conserve ecosystems and species, and the need to provide access to fishery resources to poor coastal communities. The reality of post-apartheid South Africa is that there is an urgent requirement to provide greater equity of access to the nation's natural and economic wealth as much as to conserve and use resources on a sustainable basis (Van der Elst *et al.* 1997). Other important statutes implementing South Africa's international commitments include the Environment Conservation Act, the National Parks Act, and the World Heritage Convention Act (SA ECA 1989; SA NEMA/BA 2004; SA NPA 1976; SA WHCA 1999).

Tanzania similarly invokes international principles in its legislation and policy documents. The National Environmental Policy draws heavily on sustainable development thinking and intergenerational equity (TZ NEP 1997). The National Forest

Policy is inspired by the CBD in providing for biodiversity conservation at the genetic, species, and ecosystem levels (TZ NFP 1998). However, it appears that Tanzania has not always legislated important treaty provisions where one would expect this to occur. For example, it can be noted that CITES[xxxvii] provisions have not been incorporated in the Marine Parks and Reserves Act, even though marine parks and reserves under the act are no-take zones (TZ MPRA 1994).

Mozambique has likewise implemented several global international conventions in its legislation, including ones on biodiversity, desertification, and wetlands. Some of these conventions provide a basis for the development of specific legislation or policies such as the Nairobi Convention,[xxxviii] which provides a foundation for the national strategy for the protection and development of the coastal zone. Similarly to Tanzania and South Africa, Mozambique's constitution and environmental law incorporate rights and duties of its people in relation to the environment (MZ Constitution 2004; MZ EL 1997). However, it is clear that Mozambique's implementation efforts have been hampered by a lack of technical and research capacity, insufficient interinstitutional coordination, bureaucratic obstacles, language constraints, lack of access to usable public environmental information, illiteracy, insufficient public understanding and support, lack of financial resources, and vulnerability to natural hazards. A direct consequence of these constraints is the delay in the national implementation of its international commitments.

The three states have a variable record in the designation of protected sites with an international status pursuant to their conventional obligations (Ramsar Secretariat 2007; UNESCO/WHC 2007). South Africa has 17 Ramsar sites (498,721 hectares) (including 6 in KwaZulu-Natal, which is the provincial neighbor of Mozambique) and 7 World Heritage sites (Ramsar Secretariat 2007). iSimangaliso Wetland Park is both a Ramsar and a World Heritage site. Tanzania has four Ramsar sites (4,868,424 hectares), one of which is the Rufiji-Mafia-Kilwa Marine Site. Tanzania has seven World Heritage Sites.[xxxix] Although Mozambique has one World Heritage site and one Ramsar site, the area covered is a sizable 688,000 hectares.

Most importantly, all three states signed on to the 2004 CBD COP decision to achieve effective protection of 10% of marine ecoregions by 2012.[xl] As noted at the outset of this article, Mozambique and Tanzania are reported to be making good progress toward reaching those targets (at least until recently up to 8.1% for Tanzania's and 4.0% for Mozambique's continental shelf areas) (Wells, Burgess, and Ngusaru 2007). South

Africa's record is also significant, as mentioned at the beginning of this article. Clearly, the CBD commitment provides a strong incentive for all three states to establish more MPAs, including MPA networks and transboundary MPAs.

2.3 Settled Jurisdictional Boundaries

Reference to the degree of jurisdictional certainty of each state is pertinent because each of the three states will have internal MPA responsibilities up to the limits of its maritime zones, and will need to coordinate the exercise of pertinent legislative and enforcement jurisdictions on its side of the border in cooperation with the neighboring state concerned. Arguably, settled boundaries are more likely to facilitate clarity, certainty, and predictability in the exercise of national jurisdiction and thereby avoid or minimize conflict with a neighboring state over varying interpretations of legitimacy of national action (Johnston 1988). By and large, the three states have claimed most of the maritime zone and jurisdictional entitlements permissible under UNCLOS;[xli] namely, the territorial sea, contiguous zone, and 200-nautical-mile EEZ (MZ LM 1996; SA MZA 1994; TZ TSEEZA 1989). This is important for the purpose of determining the type and full extent of maritime legislative and enforcement jurisdiction that the three states may exercise with reference to MPAs. There are some differences, however, in their respective claims. Mozambique and South Africa claim all the above-ocean zones. At the time of writing, only South Africa had made a submission concerning the outer limits of the continental shelf beyond 200 nautical miles for consideration by the Commission on the Limits of the Continental Shelf established under UNCLOS. Mozambique was expected to make a submission, but has not, while Tanzania does not appear to have taken steps with respect to its continental shelf. However, these submissions will not likely be material any time soon for MPA networks and transboundary MPAs in the EAME region, which are likely to be located well within the territorial sea and EEZ. Also, Mozambique and South Africa have incorporated most of the UNCLOS provisions concerning baseline delineation[xlii] (MZ LM 1996; SA MZA 1994). Tanzania has not fully incorporated the baseline provisions; in particular, in relation to the straight baseline and bay closing line methods (TZ TSEEZA 1989). Tanzania may not have fully maximized the internal waters it can claim, although this is unlikely to affect transboundary MPA management with Mozambique.

With their maritime boundary settled by agreement in 1988, there are no outstanding boundary issues between Mozambique and Tanzania.[xliii] The maritime boundary between Mozambique and South Africa has not been settled. Both states appear to observe the median line rule for undelimited territorial sea boundaries in UNCLOS,[xliv] which is the maritime zone and boundary segment of greatest relevance for the most likely transboundary MPA scenario between the two states. Whatever the provisional arrangement might be, there is no legal boundary and it is conceivable that issues may arise in the exercise of enforcement jurisdiction along the putative territorial sea boundary.

2.4 MPA Policy Objectives

The ocean policy literature provides useful pointers for MPA policymaking. Miles defined policy as a "purposive course of action in response to some set of perceived problems" (Miles 1989, at 214).Writing on national ocean policy, Levy described policy at this level as "global in scope and intent, formulated at the highest decision-making level" (Levy 1993, p. 77). A national policy for MPAs similarly implies that it ought to be formulated at a high level of decision making, even though its scope will be narrower than that of national ocean policy. For the purposes of comparative assessment, it is necessary to consider the existence of policies, commitments, or both in support of the establishment of national MPAs. The seniority of a decision is a prima facie indicator of the degree of political commitment.[xlv] Analogously with ocean policy and guided by CBD principles, a national MPA policy should:

- Express the national political will on conservation aspirations including a willingness to cooperate with neighboring states;
- Identify marine conservation objectives at the ecosystem, species, and genetic levels, and the pursuit of these *in situ* and *ex situ*;
- Respond to or anticipate problems and issues arising from the establishment and implementation of MPAs;
- Provide direction and purpose for governmental efforts while rationalizing intergovernmental and multiagency efforts;
- Provide a basis for the allocation of financial and administrative resources; and
- Establish a framework for inclusive participation by stakeholders.

It does not appear that Mozambique, South Africa, and Tanzania have adopted standalone MPA policies. Rather, their policy frameworks for MPA making are embedded in larger policy documents such as environment (and biodiversity), fisheries, and coastal zone management. Each of the three states draws policy guidance from various instruments. The effect of some of these instruments is to legislate policy. It is arguable that, as long as there are clear directions for MPA making in the various instruments, there is not a need for an MPA policy confined to one instrument. In their overall approaches, all three are influenced by contemporary thinking in terms of balancing conservation and socioeconomic objectives and, in particular, with due regard to poverty alleviation needs.

In South Africa, the leading instrument for MPA making has historically been the Marine Living Resources Act and, to a lesser extent, the National Parks Act. Today, the South Africa National Environmental Management: Protected Areas Act provides for a more coordinated approach to creating protected areas, including MPAs, and sets out the objectives and framework for the declaration and management of protected areas generally (SA NEMA/PAA 2003). The 2003 act sets out the objectives and framework for the declaration and management of protected areas generally. The act also places emphasis on cooperative governance and establishment of systems of protected areas, including representative networks, while providing for sustainable utilization and inclusive participation. This is particularly relevant for South Africa's efforts in establishing MPA networks with its neighbors. The act sets out precise and detailed reasons for the establishment of protected areas, including MPAs. Complementary to the act is the White Paper on Marine Fisheries Policy for South Africa, which provides a framework for resource management directions including equity issues in fisheries (SA WPFP 1997). The Marine Living Resources Act further sets out principles and policy objectives for fisheries based on ecosystem and biodiversity protection, equity, precaution, and a participatory approach to decision making (SA MLRA 1998).

Recently, South Africa adopted comprehensive framework legislation, which now serves as the larger context for MPA making. Prepared in 2008, the National Environmental Management: Integrated Coastal Management Act was assented to on 11 February 2009 (SA NEMA/ICMA 2008). The act comes on the heels of a prolonged consultative process that included a Green Paper (SA GPCP 1998), a White Paper on Coastal Policy (SA WPCP 2000), and a publicly circulated draft Integrated Coastal

Management Bill (SA ICM Bill 2006). The definition of the coastal zone is one of the most comprehensive for such legislation in that it covers not only the land-sea interface area, but also the full extent of the EEZ and includes functions normally reserved for other environmental protection legislation such as release of effluents, incineration, and dumping of wastes. The coastal zone is looked at as management space for the protection of the marine environment, use regulation, and within which management intervention may be necessary. The act provides for coastal protection zones and coastal protected areas. The former enable ". . . the use of land that is adjacent to coastal public property or that plays a significant role in a coastal ecosystem . . .," a useful tool providing the management and conservation authority to support the terrestrial portion of protected areas that are both coastal and marine (SA NEMA/ICMA 2008, section 17). Coastal protected areas may be designated for management by a state organ and, in this respect, could potentially overlap with other legislation by virtue of which MPAs may be established in South Africa. The act appears to have anticipated the potential overlap by providing that, by notice in the Gazette, "the whole or any part of a protected area that is not coastal public property, will not form part of the coastal protection zone" after consultation with the management authority of the protected area (SA NEMA/ICMA 2008, section 22). The overlap will likely not be totally avoided where MPAs (and protected cultural heritage sites) established under other legislation also include coastal public property.

Tanzania's most significant document in support of MPA making is the National Environmental Policy, a framework instrument that has conservation and enhancement of natural and man-made heritage, including biological diversity and unique ecosystems, as one of the overall objectives (TZ NEP 1997). Policy-makers in Tanzania appear to be particularly conscious of past problems of conflicting and uncoordinated policies. There is an expectation that biodiversity conservation be integrated into all relevant government initiatives. This thinking permeates the National Forest Policy, the National Land Policy, and the National Fisheries Sector Policy and Strategy Management (TZ NFP 1998; TZ NFSP 1997; TZ NLP 1995). In forestry, which is relevant to the conservation of mangroves as habitats for many coastal and marine species, the protection of unique ecosystems and biological diversity is pursued with regard to the needs of the local population. For MPAs with a coastal component, the land policy is relevant because one of the objectives is to protect sensitive areas. The fisheries policy is even more direct in

promoting the protection of fragile ecosystems, vulnerable and endangered species and their habitats, and areas of special ecological significance. This policy promotes the establishment of marine parks, reserves, and closed breeding areas on the basis of collaborative management with user communities. According to the National Integrated Coastal Environment Management Strategy, the protection of areas of high biodiversity should be achieved *inter alia* through incorporation of these areas into existing MPAs and the creation of new MPAs "where local communities support the concept of a park" (TZ NICEMS 2003, at 25). This instrument proposes the implementation of Special Area Management Plans in transboundary areas where "significant coastal management issues exist" (TZ NICEMS 2003, at 26), enabling the central government, together with local authorities and stakeholders, to plan and manage coastal areas of special importance. In general in Tanzania, conservation policy and practice appear to support the establishment of transboundary MPAs, as is further evidenced by the National Fisheries Sector Policy, the Fisheries Act, and the Marine Parks and Reserves Unit Strategic Plan for 2005/2009 (TZ FA 2003; TZ MPRU 2005; TZ NFSP 1997).

Mozambique has a range of policies that support biological diversity conservation and MPAs. In particular, the 1995 Environmental Policy addresses, among other issues, coastal zone management and the creation of marine parks as a tool for the development of marine and coastal resources (MZ EP 1995). The Strategy and Action Plan for Biodiversity Conservation in Mozambique was produced by a unit within the Ministry for the Coordination of Environmental Affairs (MICOA) and is the country's plan to implement and meet the targets of the Convention on Biological Diversity (MZ SAPBC 2003), including marine resources and in situ conservation. The National Tourism Policy and Implementation Strategy promotes protected areas by blending development and conservation objectives, and facilitating private investments and benefits for local communities (MZ TPIS 2003). This policy, as well as the national Fisheries Policy and Strategy for its Implementation, targets distribution of benefits and poverty alleviation (MZ FPSI 1996; MZ TPIS 2003). The National Land Policy similarly provides for protection zones, but also guarantees land use access by the people (a major issue) and protects customary rights of access to rural communities (MZ NLP 1995). In Mozambique, land is vested in the state and, accordingly, government has a fundamental responsibility for its conservation and for providing access to its benefits for the people

(MZ Constitution 2004). Several other sectoral policies include environmental concerns in their goals.

2.5 Existence of a National and Subnational Legal Framework for MPA Making

In examining governance indicators for the purpose of evaluating MPAs, Pomeroy, Parks, and Watson (2004) advised that consideration of the

> existence and adequacy of legislation to enable the MPA to accomplish its goals and objectives is a measure of formal legislation in place to provide the MPA with a sound legal foundation so that the goals and objectives of the MPA can be recognised, explained, respected, accomplished and enforced. In some areas, traditional law may also serve as a foundation for the MPA. (at 175)

Accordingly, the existence and degree of MPA-related legal development– whether formal (i.e., legislation) or informal (i.e., customary; Pomeroy, Parks, and Watson's "traditional") – is essential for a comparative assessment. MPAs may be established under dedicated legislation (i.e., statutes and rules specifically developed for MPA purposes), but other sectoral legislation may be important to further MPA objectives (e.g., the establishment of no-take zones in fisheries legislation or areas to be avoided in navigation under shipping legislation).

Pomeroy, Parks, and Watson (2004) justified "enabling legislation" (as an evaluation indicator) as being necessary for successful implementation of the MPA management plan (at 175). Further, and perhaps even more fundamentally, a proper national and subnational legal basis provides legitimacy for MPA making and the consequent measures that may have to be taken such as restrictions on or closure of access to resources. In addition to examining the recognition of MPAs in the national legal system, a comparative assessment also needs to consider the extent to which there is legal basis to support the "network" approach to MPA making in national law as a systematic approach to protected areas based on representativeness of natural systems in the state, in relation to neighboring states, and, ideally, also in the region (Kelleher 1999). Citing Christie and White, Sanders and Cochrane (2006) noted that networks should also function to accomplish social as well as ecological goals. This is important in East Africa because MPAs have the potential of contributing to poverty alleviation, a major regional

concern.[xlvi] Ascertaining the extent to which national law promotes social as well as conservation objectives is relevant.

Mozambique, South Africa, and Tanzania have highly developed legislative frameworks to support the designation, implementation, and management of national MPAs. There are few legislative and policy provisions that direct efforts at regional MPA networks or transboundary MPAs. However, the well-developed national legal frameworks appear to support national MPA commitments that may be undertaken in coordination with similar MPA initiatives of neighboring states. All three states have modern legislation, mostly post-1992. Also, all three states have local customary law that may play a role in MPA making and management.

The constitutions of the three states address environmental protection. In Mozambique, the national government and local authorities are required to legislate for environmental protection and rational utilization of resources, in cooperation with other environmental associations (MZ Constitution 2004, Article 90). Clearly, the national government has conservation duties (MZ Constitution 2004, Article 102). South Africa's constitution provides a citizens' and intergenerational right to an environment not harmful to human health (SA Constitution 1996, section 24) and conservation and sustainable development, including ecological integrity, are also addressed. There is a right of access to natural resources rather than a right to the resources themselves (SA Constitution 1996). Tanzania places a duty on every citizen to protect the country's natural resources (TZ Constitution 1977). The Tanzanian constitution is sensitive to the need to consider natural resource development with reference to human development, especially the eradication of poverty. As seen elsewhere in this article, the latter is also a salient policy concern in Mozambique and South Africa.

Protected areas in South Africa can be designated under several statutes depending on the particular purpose of the designation. There are roles to be played by national and provincial governments. Jurisdiction over marine areas is a national government responsibility but, in some cases, the provinces are allocated roles in the implementation of nationally designated protected areas. As noted earlier, the lead legislation is the National Environmental Management: Protected Areas Act, which replaced prior legislation on protection and conservation of South Africa's biodiversity, landscapes, seascapes, and environmental goods and services (SA NEMA/PAA 2003). The act adopted a common international practice of generally following the six categories

of MPAs set out by the International Union for the Conservation of Nature (IUCN) (Kelleher 1999). Closely related is the Biodiversity Act, which empowers the minister to enter into agreements with neighboring states to secure the effective implementation of a bioregional plan containing measures for effective management and monitoring of biodiversity (SA NEMA/BA 2004, sections 40–41). Other statutes also empower the minister to declare MPAs. In a fisheries context, the Marine Living Resources Act empowers the minister with this prerogative (SA MLRA 1998, section 43). The Environment Conservation Act empowers the minister to declare Special Nature Reserves, including in the territorial waters of South Africa, to protect the environment or special characteristics and features (SA ECA 1989, section 18). The National Parks Act permits the establishment and management of national parks (SA NPA 1976). The World Heritage Convention Act is the basis for the designation of World Heritage sites (SA WHCA 1999). The Integrated Coastal Management Act is state-of-the-art legislation that has reorganized marine environmental protection and conservation with a unique integrated approach that includes provision for coastal protected areas, coastal wetlands, specially protected areas, and special management areas. The definition of *coastal waters* includes "marine waters that form part of the territorial waters or the internal waters" and estuaries, and the "coastal zone" includes the EEZ (SA NEMA/ICMA 2008, section 1).

The significant number of instruments providing a ministerial power to designate a protected area may, at first blush, suggest unnecessary complexity and inefficiency. However, only one national government department has, until recently, dealt with MPAs: the Department of Environmental Affairs and Tourism (DEAT). New government structures introduced after the 2009 elections have seen DEAT split into three ministries: Agriculture, Forestry and Fisheries; Water and Environmental Affairs; and Tourism. Each is likely to have a stake in MPA development, but the exact details and implications remain to be finalized and clarified.

There may be an issue respecting hierarchy of legislation for a specific MPA; for example, in terms of what statute takes priority over the same area should there be conflict between legislative provisions. This could have a bearing on management and reporting. The Integrated Coastal Management Act attempts to address this concern and provides that the act prevails over other legislation in relation to coastal zone management concerns (SA NEMA/ICMA 2008, section 6).

In Tanzania, the Environment Management Act lays out a broad legal framework for the enhancement, protection, conservation, and management of the environment with a strong emphasis on integration and sustainability (TZ EMA 2004). The statute most directly related to the establishment of MPAs is the Marine Parks and Reserves Act, which was specifically adopted to provide for the establishment, management, and monitoring of marine parks and reserves with the purpose of conserving, protecting, and restoring species, habitats, and ecosystemic processes (TZ MPRA 1994).[xlvii] Mafia Island Marine Park and Mnazi Bay Ruvuma Estuary Marine Park were established as marine parks under this statute. MPAs in Tanzania can also be established under other statutes that serve a more general purpose. For example, the Saadani National Park was established under the National Parks Ordinance, although this statute does not specifically provide for MPAs *per se* (TZ NPO 1959). The Dar es Salaam and the Maziwe Island Marine Reserves were both declared under the Fisheries Act (TZ FA 1970). According to the Marine Parks and Reserve Act, the minister responsible for national parks may, after consultation with the relevant local government authorities, declare any marine park or any part of a marine park to be a national park. Under the Fisheries Act, the minister may take protective measures, but not all fisheries legislation appears to support MPA making. Previously, the Deep Sea Fishing Authority Act provided no conservation mandate or provision for the establishment of MPAs in the EEZ (TZ DSFA 1998), but this changed with amendments to the act in 2007. According to the amended Deep Sea Fishing Authority Act, the Deep Sea Fishing Authority has additional functions to safeguard the EEZ environment and to implement any agreement reached at regional and other international levels to which Tanzania is a party (TZ DSFA 2007). Finally, under the more general Environmental Management Act, the minister may, on the recommendation of the National Environmental Advisory Committee, declare as an Environment Protected Area an area of land considered ecologically fragile or sensitive for various reasons, including international commitments, ecological and landscape values, local community interests, and so on (TZ EMA 2004).

As in the cases of South Africa and Tanzania, the general environmental law of Mozambique incorporates modern international environmental law principles (e.g., precaution, traditional knowledge, ecosystem protection, inclusive participation, gender equity, polluter pays, environment impact assessment (EIA)), providing an important overarching principled framework for environmental management and conservation

efforts. The Environment Law provides for environmental protection zones over terrestrial and marine areas in order to facilitate protection of ecosystems that have ecological, socioeconomic, aesthetic, cultural, scientific, and other values (MZ EL 1997). Similar provision for protection zones exists in the Land Law and the Forestry and Wildlife Law (MZ FWL 1999; MZ LL 1997). The latter provides for the establishment of various types of conservation and protected areas. Other statutes provide for the taking of management and conservation measures. The Fisheries Law provides for the adoption of conservation and management measures, including: minimal size or weight of species, closed seasons, limited or no-access areas, minimum mesh size, permissible fishing gear methods, catch quotas per boat or person, schemes for limiting access or effort, and fish sanctuaries (MZ FL 1995, Article 35a). The Tourism Law plays a role in the conservation of terrestrial and marine biodiversity (MZ TL 2004) and the Local Organs Law enables district authorities to propose protected areas, designate ecological zones and other protected areas, and establish reserves using their land use planning powers (MZ LOL 2003). Mozambique is considered to have a good system of representative protected areas, accounting for some 12.6% of the land surface of the country and 4% of the continental shelf (Wells, Burgess, and Ngusaru 2007). With the designation of Inhaca Island as a protected area in 1965, it also has one of the oldest MPAs in the region.[xlviii]

2.6 Regulatory Tools for Land Use Planning, Marine Spatial Planning, and Resource Use

Legal recognition may be sufficient for designating and establishing MPAs but, for management purposes, an MPA manager will be concerned with human and ecological uses of the area concerned. Thus an MPA manager, as a type of marine manager, needs to be equipped with or have access to a range of tools appropriate for the regulation of marine resource and nonresource uses. Where an MPA includes a terrestrial component, the marine manager may also perform coastal management functions. Tools for MPA managers may be specifically provided in MPA-dedicated legislation or in other existing legal instruments. For example, regulatory tools for fishery management purposes may include zoning, licensing, permissible fishing gear, habitat protection, closed seasons, no take zones, and so forth, which may be useful for MPAs that include fishing interests. Shipping legislation frequently includes regulatory powers consisting of standard-based safety and environmental regulation, including vessel waste discharges into the marine

environment and routing schemes that include navigation routes, traffic lanes and separation schemes, areas to be avoided, mandatory and voluntary reporting, and so forth. Environmental and wildlife legislation may address discharges and dumping in the marine environment, species-specific protection, habitat protection, EIA, and so forth. Similarly, in land use law, zoning and related planning tools can be useful for the MPA manager. More recently, in some jurisdictions, marine spatial planning is being promoted as an essential ocean management tool complementary to integrated coastal zone management (European Union 2008).

Mozambique, South Africa, and Tanzania's suite of environmental and sectoral statutes provide a wide range of tools to support conservation and the regulation of resource and nonresource uses within MPAs. In Tanzania, any area declared as an Environment Protected Area under the Environmental Management Act can be managed by the tools provided under the act. These tools include zoning, access restrictions, fees, and so forth, and a broad power for "any other measure deemed appropriate for proper and sound use of the area" (TZ EMA 2004). The limitation is that the legislation applies to terrestrial, inland waters and shoreline areas, but not to marine areas which are covered under other legislation. These powers are, however, valuable for the coastal and estuarine parts of an MPA. The Marine Parks and Reserves Act requires general management plans for a park or reserve and provides an EIA requirement for certain activities within a park. Parks and reserves are generally considered no-take zones (TZ MPRA 1994). Guided by the National Forest Policy, the Forests Act also provides for EIAs as a management tool and for the establishment of forest reserves and buffer zones around them (TZ FA 2002; TZ NFP 1998). The Fisheries Act has various resource access, management, surveillance, and enforcement tools. The minister has a regulatory mandate for the protection of critical habitats, closed periods, and conservation (biodiversity, habitat, and endangered species) (TZ FA 2003).

South Africa's statutory management tools are similar to Tanzania's. The Marine Living Resources Act empowers the minister to declare protected areas, and this provision has been used to renew protected area status for South Africa's marine parks (SA MLRA 1998, section 43). Further, the Minister of Fisheries may declare certain areas to be under special management control as fisheries management areas. Similarly, the Environment Conservation Act enables the designation of Limited Development Areas within which strict control is imposed on certain developments (SA ECA 1989, section

23). EIAs are also an important tool that can be used for MPA purposes under the National Environmental Management Act, and this includes public participation (SA NEMA 1998).

Mozambique law similarly provides for a wide range of regulatory authority to adopt management and conservation measures, including EIA and environmental audits (MZ EAR 2003; MZ EIAR 2004), fishery management zoning, species-specific protection (e.g., turtles), licensing and effort control (MZ REPMAR 2003), environmental quality standards (MZ RSEQ 2004), marine pollution prevention (MZ PPO 1973), strategic environmental assessment,[xlix] and so forth. Regulations tend to provide more detailed powers for the establishment of marine parks, reserves, and other protected areas (e.g., MZ REPMAR 2003).

2.7 Institutional Mandates

A corollary to the requirement for a solid legal foundation for MPAs is the need for an institutional framework, which includes a clear allocation of a legal mandate for MPA purposes. This mandate needs to set out the lead role to be played by an identified institution, its functions and powers, and its relationship to other interested institutions. The lead institution will normally be expected to perform its functions in cooperation with other national agencies, other levels of government and local authorities, and interest groups, including communities and stakeholders. Vertical (intergovernmental in a domestic setting) and horizontal (interagency) coordination, especially where institutional mandates overlap, is important to enable effective MPA management. The reality of sectoralization of government functions requires the lead institution to collaborate with other government agencies. This may be a requirement set out in parent legislation (Vallejo 1992). Mozambique, South Africa, and Tanzania have significantly different institutional frameworks for MPA making. Each of the three states has multiple institutions at various levels of decision making, and the degree of vertical and horizontal coordination among the multiple institutions involved is variable.

Environmental policy in South Africa is set at the national level, with provinces carrying considerable responsibilities for its implementation; especially, in the coastal and marine environment. Responsibility for the administration and coordination of the national policy and legal framework concerning MPAs has been the responsibility of the DEAT, with provincial departments of environment having a role in implementation.

Changes introduced after the 2009 reshuffle50 are likely to split the responsibility for MPAs between fisheries and environment ministries. The past centralization of this responsibility in the DEAT allowed for a common strategic approach, even when MPAs were proposed by different agencies under different instruments. It also meant that contributions to national, regional, and international responsibilities could be better evaluated and the meeting of MPA targets by 2012 better coordinated. It remains to be seen if the new government structures will retain this efficient "one-stop-shopping" approach.

In Mozambique, although the lead agency is MICOA, there are overlapping mandates among ministries. MICOA is the national government's lead agency for developing and implementing environmental policy, and for the coordination for the proper planning and utilization of natural resources (MZ MICOA 1995, Article 1). There are at least three national government institutions with responsibilities for the establishment and management of wildlife resources, including the Ministry of Agriculture (overall responsibility for wildlife management in free areas and reserves), the Ministry of Tourism (national parks and reserves including "Transfrontier Conservation Areas" and hunting areas), and the Ministry of Fisheries (in regulating fishing). Related functions are also performed by the MICOA and the Ministry of Education and Culture (social-cultural heritage matters).

Under Tanzania's Marine Parks and Reserves Act, the Marine Parks and Reserves Unit (MPRU) is responsible for management of those protected areas. Under the National Parks Act, the Tanzania National Park Authority advises the minister on the establishment of reserves and parks, including marine parks. The president proceeds with designation only after a resolution is submitted by the minister to parliament and is passed. However, there appears to be confusion on the structure, functions, and responsibilities of the MPRU, including its relationship to the director of fisheries. Difficulties are experienced by the MPRU, as a centralized institution, in the establishment and management of MPAs. Further, there are as many as 10 ministries that have mandates touching on coastal and marine resource and environmental issues. Of particular interest in Tanzania's institutional framework for MPAs is the role of lower levels of government. Local management by communities is more viable if those communities are persuaded of the value and benefits to be reaped from taking on this responsibility. Under the Town and Country Planning Ordinance, local authorities are

empowered to declare and regulate planning areas (TZ TCPO 1956). There is a potentially important role for local urban government authorities in the taking of measures or making bylaws in support MPAs under the Local Government (Urban Authorities) Act (TZ LGUAA 1982). For example, measures for the conservation of natural resources may be taken at this level of government (e.g., prevention of soil erosion, food inspection). Local government authorities are empowered with fisheries licensing and enforcement and are normally involved in the management of marine parks and reserves in an advisory capacity under the Local Government (District) Authorities Act (TZ LGDAA 1982). Under the Village Land Act, villages have land management responsibilities that require them to consult and be consulted (TZ VLA 1999).

2.8 Process for MPA Decision Making as Established in Law

Attention needs to be given to the designation, establishment, implementation, and ongoing management of MPAs. Differences can be expected as to how decision making is set out in relevant national legislation, whether decisions are *dirigiste*, that is top down by the mandated government institution, or bottom up (community or stakeholder driven), or somewhere in between such as in comanagement (shared between the government or community and stakeholders), or perhaps even a mixture of the above depending on the situation (Hildebrand 1997). The degree of similarity or differences in legal processes (and cultures) of decision making between Tanzania and Mozambique, and Mozambique and South Africa will be important to understand as these will be relevant considerations for cooperative MPA networks and transboundary MPAs.

Mozambique, South Africa, and Tanzania have different procedures for MPA establishment. In South Africa, the procedure depends on the statute used to designate a protected area but, as noted earlier, the decision for establishing an MPA has to date remained the responsibility of DEAT. The MPA designation process in South Africa (see Figure 2) may be initiated by any person or the government itself. The process tends to invite stakeholder, public, and governmental comment, after which a proposal is revised and submitted to the minister for approval. The MPA is then declared and published in the government Gazette. National parks and World Heritage sites need parliamentary approval before proclamation and, likewise, the termination of park status requires parliamentary assent. An integrated management plan is not necessarily adopted at the outset, but would normally be completed within 6 months of the designation of an MPA

under the National Environment Management Protected Areas Act (SA NEMA/PAA 2003, section 39(2)). This is a responsibility that the minister delegates to a provincial or park authority and is undertaken with public participation. However, MPAs declared solely under the Marine Living Resources Act have no obligation to produce such management plans. There have been problems of transparency and decision making in some MPAs.

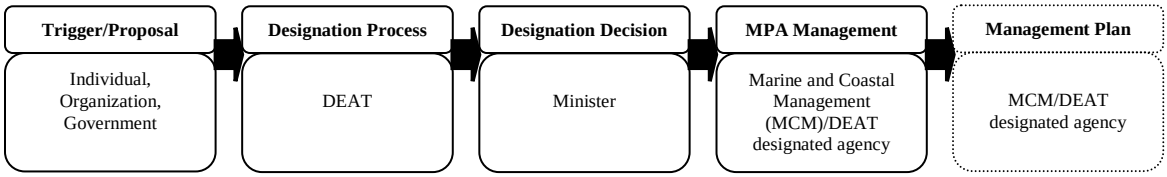

Figure 2 - MPA designation process in South Africa. Abbreviations: DEAT, Department of Environmental Affairs and Tourism; MPA, marine protected area.

In Tanzania, marine parks and reserves are similarly established by the minister after consulting local authorities. A local authority or other nongovernmental institution or person may also advise the minister to establish an MPA (see Figure 3). The governmental legwork is undertaken by the MPRU. The Board of Trustees of the MPRU appoints the warden for an MPA and, in turn, the warden may appoint park officers in consultation with the board. Once established, an MPA plan will be developed by the board, the advisory committee of the MPA, and village councils. As in the case of South Africa, this is to occur within 6 months of declaration of an MPA. The minister has to approve the plan (TZ MPRA 1994, section 14); however, the actual management is the responsibility of the park management team.

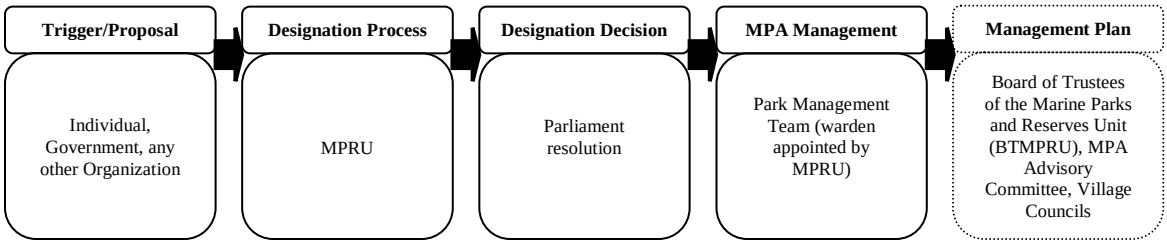

Figure 3 - MPA designation process in Tanzania. Abbreviations: MPRU, Marine Parks and Reserves Unit; MPA, marine protected area.

In Mozambique, the establishment of protected areas follows different processes (see Figure 4), top down or bottom up, depending on the institution from which a proposal arises. At the provincial or local level, a proposal arising from the decentralized ministry services (either as the proponent or on behalf of an individual or entity from which the proposal was originally created) is subject to the approval of the Council of

Ministers, after being channelled by the central services. If the proposal was initiated by the local government, the relevant ministries will contribute to the process, after which the proposal is sent to the Council of Ministers, following scrutiny from the Inter-institutional Technical Committee for Coastal Management and by the National Council for Sustainable Development. In both of these processes, community consultation is mandatory only at the establishment phase and as a contribution to the management plan. Yet another process for the establishment of protected areas commences with communities and other relevant stakeholders, and its results as well as other technically relevant documentation (including the management plan) are subjected to the approval of the relevant entities.

The major difference between the top-down and the bottom-up approaches is that the former is based on the potential of an area to be proclaimed and the latter relies on technical information with supporting evidence that there are biophysical and social conditions to establish a conservation area. In the particular case of MPAs, only the Ministry of Fisheries and the Ministry of Tourism can initiate a proclamation process.

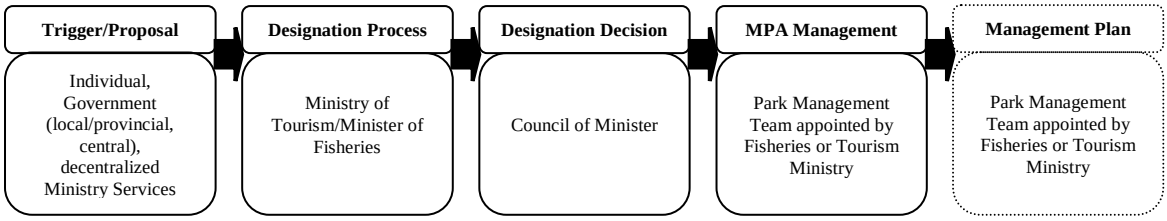

Figure 4 - MPA designation process in Mozambique. Abbreviation: MPA, marine protected area.

2.9 Participatory Rights and Processes

This criterion is closely related to the previous one. Whereas the previous criterion considered decision making from the perspective of the mandated institution, participatory rights and processes relate to the expectations of communities and stakeholders to be included in decision making processes. This expectation can be legal (in terms of a legislated or customary right, i.e., enforceable), as much as political, social, and ethical. Pomeroy, Parks, and Watson (2004) wrote that

> *the level of stakeholder participation in the management of the MPA is a measure of the amount of active involvement of people in making MPA management decisions or involvement in management activities and of*

> *their satisfaction with their level of participation, including if their views and concerns are being heard and considered by MPA managers.* (at 193)

The significance of this, Pomeroy, Parks, and Watson (2004) continued, is that if there is inclusive participation of stakeholders, they are more likely to develop a sense of ownership and more likely to be compliant with management measures (at 193). Others have similarly noted that top-down approaches to decision making have frequently led to failure in fisheries management and MPAs (Christie and White 2006; Cochrane 2007; Salm, Clark, and Siirla 2000; Sanders and Cochrane 2006; World Resources Institute 2004). Accordingly, for the purposes of the comparative assessment, it is useful to determine how the policy and legal framework in each of the three states provides for inclusive participation. In particular, community and stakeholder compliance on either side of the borders between Mozambique and Tanzania and Mozambique and South Africa (KwaZulu-Natal Province) can be expected to be critical for the success of prospective transboundary MPAs in the border regions.

Consistent with modern governance practices, the legislation of Mozambique, South Africa, and Tanzania provides for public participatory rights and processes in developmental and environmental decision making. As part of the general process of democratization in post-apartheid South Africa, there has been a consistent trend toward promotion of inclusive participation in policy development in support of environmental legislation. Legal standing to enforce environmental law through public and private prosecution, including public interest actions, is provided in the National Environmental Management Act (SA NEMA 1998, sections 32–33). In particular, the act provides that any person can seek appropriate relief with respect to any breach or threatened breach of any of the principles of the act (SANEMA 1999, section 2). Consultative processes are also built into conservation decision making.

This is also the case in Tanzania. Tanzania's Fisheries Act provides for Beach Management Units, a type of comanagement mechanism, to enable local community stakeholders to cooperate with the government in the management, conservation, and protection of local fishery resources (TZ FA 2003). Also, under Tanzania's Marine Parks and Reserves Act, the park warden has a duty to involve affected villages in the establishment, governance, and management of the park or reserve, and village representatives have a right to advise officials on management and conservation matters and, thereby, also benefit from the park (TZ MPRA 1994). Village representatives are

part of an MPA's advisory committee and, together with this committee, they are responsible for proposing a general management plan for an MPA to the respective board. Public participation in environmental decision making is also fostered by the Environmental Management Act (TZ EMA 2004).

Similarly in Mozambique, various policies and legal instruments promote public participation, especially, local communities, on issues of development and conservation of biological diversity (e.g., MZ SAPBC 2003). Environmental legislation requires community participation and the utilization of their knowledge (MZ EL 1997, Article 30). The law requires decentralized implementation to enable local participation, initiative, and benefit (MZ EL 1997, Article 7). Decentralization envisages participative administration and management, including public-private partnerships. In the establishment of conservation areas, the "timing" of the consultation process depends on how the proclamation is initiated: if top down, consultation takes place during the elaboration of the management plan; if bottom up, consultation is part of the proposal presented to the authorities.

There is an uneven practice in the public dissemination of information, especially, of the regulatory type, and access to public information. In South Africa, on the one hand, public access to information is elevated to the status of a basic principle in the National Environmental Management Act (SA NEMA 1998, section 2). On the other hand, communications from an MPA itself are generally weak and there is little public access to that information. In Mozambique, there appears to be a lack of awareness at all levels of society about environmental legislation with respect to the coastal zone. With lack of freedom of information legislation, poor communication infrastructures, and high illiteracy rates, especially, in rural areas, public access to information is an issue in Mozambique. Since 2000, Mozambique has had an Information and Communication Technology Policy (ICT) that aims at enhancing the infrastructure to enable provision of a wide range of information important for national development, including natural resources management (MZ ICT Policy 2000). In comparison, in Tanzania, the dissemination of knowledge on parks and reserves is an important legislated objective (TZ MPRA 1994). It is conceivable that effective participatory processes could be hampered if there is insufficient dissemination of knowledge to enable informed participation by communities and other stakeholders and this, in turn, could hamper buy-in into existing and future MPAs. There has been criticism in Tanzania that there are legal

and institutional barriers to effective access to information by the public. For example, "there is no single government source of environmental and natural resource information for the public. With no central repository for environmental information, the public must make requests to multiple sources to get all relevant information" (LEAT 1999, p. 8).

2.10 Enforcement and Incentives for Compliance

Ideally, an MPA should create an atmosphere of stakeholder compliance as a consequence of management efficiency and effectiveness, without the need to divert resources into compelling behavioral outcomes. In addition to the likely benefits of inclusive participation, the policy and legal framework may anticipate the provision of benefits for compliance such as fiscal, economic, or social and cultural benefits for stakeholders. But the reality is that compliance cannot always be relied on and enforcement of the law may be necessary. Enforcement gives fiat to the legal protection of MPAs and avoids the risk of having paper MPAs. It is necessary that there be proper authorization of MPA managers and related officials to undertake enforcement (Pomeroy, Parks, and Watson 2004, at 198). A comparative assessment would need to ascertain the experience in each of the three countries with respect to the enforcement of legal and management measures for MPA violations.

Having determined the existence of an MPA policy and legal framework, knowledge of its existence and functions among communities and stakeholders is an important indicator of MPA success (Pomeroy, Parks, and Watson 2004, at 202). A comparative assessment would need to consider whether mechanisms for the dissemination of this information are in existence in the three states. Knowledge is an indispensable element to facilitate inclusive participation in decision making, understanding of the reasons for management measures, and compliance with those measures.

As noted above in relation to South Africa, the provinces are largely delegated responsibilities for implementation and compliance (SA MLRA 1998, Chapter 6). For example, the Ezemvelo KwaZulu-Natal Wildlife is the conservation manager of the iSimangaliso Wetland Park and performs the enforcement functions. There is a high level of voluntary compliance in MPAs off KwaZulu-Natal, possibly due to public buy-in as a result of participatory processes in MPA making, but also because of effective zoning that enables many users to operate under tight controls (with outright prohibition limited to

sanctuary areas). This is particularly relevant for the transboundary area between Mozambique and South Africa. Where compliance issues arise, they tend to be more in relation to land ownership and terrestrial resources than to MPAs where the waters are subject to surveillance. Compliance is more of an issue elsewhere where there are higher subsistence needs or valuable resources (e.g., abalone), and where fish poaching is common. More of a problem along much of the East African coast is compliance by international shipping with basic MARPOL discharge requirements in the proximity of MPAs, but this is a problem common with many marine regions around the world.

In Tanzania, there may be an issue of meeting the statutory time requirements to put in place regulations and management plans and, thereby, facilitate compliance. Ministerial delay in enacting regulations implementing primary legislation, among others, was responsible for the late establishment of the general management plans for Mnazi Bay and Mafia Island parks. However, there are practical matters to consider. For example, the development of a General Management Plan (GMP) involves a long and intensive consultative and approval process; particularly, in relation to the identification of zones, their demarcation, and the process for securing approval of the plan. The document first has to be approved by all villages in the park, then by district authorities, followed by the Park Board and finally the minister. The process requires a considerably longer period than the 6-month period stipulated in the legislation.

In Mozambique, responsibility for enforcement within a conservation area lies with park staff and ultimately its manager. Because existing protected areas are all under the Ministry of Tourism, the park manager is expected to liaise with the local decentralized services of that ministry. However, it does not appear that local tourism services participate in law enforcement activities within conservation areas. Protected areas in Mozambique often lack sufficient staff and other resources to make enforcement effective. Compliance with the management plan is often dependent on the views and feelings of local communities on the conservation area and the impact regulations have on their daily life and subsistence. It is not unusual for conflicts to arise. For example, in the context of terrestrial protected areas, conflicts between elephant movements and human settlements often occur, including in the Maputo Elephant Reserve near Ponta de Ouro on the south coast of Mozambique.

2.11 Conflict Management Processes

Although the MPA-making process should be guided by conflict avoidance, it can be expected that the designation and implementation of an MPA may juxtapose divergent or irreconcilable interests, possibly leading to conflict. Conflicts may arise in several situations such as interagency within the government, between levels of government (e.g., national government and local authority), between government (whether national or subnational) and a community or group of stakeholders, between communities, within communities, between communities and other stakeholders, and between the respective cooperating governments themselves. Competitive behavior may concern resource access (allocation), multiple uses of the same space ("elbowing"), adverse impact of one use on others (e.g., pollution), actor (intra- and interuse) conflicts, actor-regulator conflicts, and process-related differences (participation) (Chircop 1994). The determination of mechanisms and processes for conflict management and the similarities or differences between the three states is necessary in a comparative assessment. There is a wide range of formal and informal conflict avoidance and management processes that may be adopted in whole or in part, including fact finding, negotiation, mediation, and conciliation, among others (Harness 1996; Wall and Lynn 1993).

In South Africa, the National Environmental Management Act provides structures for conciliation, arbitration, investigation, and compensation for environmental conflicts, which presumably would include MPA-related conflicts (SA NEMA 1998, Part IV). Indeed, the "Director-General shall designate an officer to provide information to the public on appropriate dispute resolution mechanisms for referral of disputes and complaints" (SA NEMA 1998, section 22). The picture is different in Mozambique's and Tanzania's legislation, where the process for managing conflicts concerning MPAs is unclear. The designation and implementation of protected areas in Mozambique has not been without difficulty. For instance, although human settlements are not permitted in conservation areas given full protection (e.g., national parks and reserves), in reality there are many communities that had been living in the protected areas before these were created (MZ FWL 1999; MZ LL 1997). This situation has generated significant conflicts between the human settlements and wildlife, and the degradation or destruction of habitat and animals. It has also led to conflicts with park authorities. For example, in the Maputo Elephant's Reserve, one or two communities take the view that they do not belong to the reserve and, thus, dispute the authority of park managers. Tanzania has also experienced

conflicts between sectoral administrative responsibilities, including in terms of licensing for resource use, monitoring, control, and surveillance.

2.12 MPA Review

Several authors in the ICOM and MPA fields have highlighted the importance of ongoing and periodic review, not only of management operations and their effectiveness, but also of the framework (including legal) for management (Chircop and Hildebrand, 2006; Cicin-Sain and Knecht 1998; Pomeroy, Parks, and Watson 2004). In essence, an MPA governance framework review is advocated as a systemic requirement in the interests of quality assurance and continued relevance. Regular monitoring and periodic review are essential to enable measurement of progress toward conservation targets and outcomes. Inclusion of review in the governance framework enables an assessment of its efficiency in helping achieve targets. Governance reviews can also be useful to ensure that equity issues (e.g., inclusive participation) are not overlooked. The assessment should consider whether review requirements are legislated in each of the three states to enable the taking stock of MPA making and cooperation on marine conservation matters on a periodic basis.

Insofar as the effectiveness of MPAs is concerned, all three states tend to monitor some aspects of the MPAs as a matter of practice. South Africa's legislation demands evaluation of MPA effectiveness against a set of performance indicators specific to each MPA but, in most cases, this is either not achieved or the indicators are inadequate to properly evaluate effectiveness. In most cases, the monitoring relates more to tourist visits and transgressions than to biodiversity issues. In the case of Mozambique, an MPA law review process would likely encounter issues of lack of capacity and the fact that MPA-related legislation is not limited to a single instrument. Therefore, any review would have to deal with many other issues that the various laws address and their original *raison d'être*. Insofar as park-specific reviews are concerned, the Limpopo National Park, as part of the wider Great Limpopo Transfrontier Park, is subject to review. MPA management plans have to be reviewed every 5 years. Bazaruto National Park was reviewed and the park's boundaries were extended to cover other sea areas and islands not included within the original boundaries. Similarly, the Maputo Elephant Reserve's boundary was extended to include 3 to 5 nautical miles of ocean space. In Tanzania, although the

Marine Parks and Reserves Act does not provide for periodic review, the GMPs do have provisions in them for conducting review park-specific reviews.

3. ASSESSMENT

This article set out with the objective of identifying and comparing the national governance frameworks for MPAs between Mozambique, South Africa, and Tanzania, and to identify issues that could facilitate or constrain MPA cooperation between them. In particular, this article has attempted to assess the degree of similarity between those national governance frameworks and identify gaps that could constrain bilateral or multilateral MPA network and transboundary MPA cooperation.

In responding to these tasks, a noticeable aspect of the environmental policy and legal infrastructure of the three countries is the recent vintage of several of the main instruments. These laws tend to be novel, modern, mostly post-Rio, and, thus, imbued with the sustainable development ethic, but possibly also insufficiently "weathered" as they may have yet to generate experience, review, and adaptive amendment. In Mozambique's and South Africa's cases, the new legislation followed the end of traumatic periods. In Mozambique's case, there has been a period of societal, legislative, and infrastructural reconstruction in the wake of the devastations of the civil war in the 1980s and until 1992. The war took a heavy toll not only on human life and socioeconomic well-being, but also on the environment and many individual species. South Africa has experienced a rethinking of basic governance structures, including environmental, since the end of apartheid and launching of democracy in 1994, but has not suffered the environmental losses of Mozambique.

Despite their modernity, the policy and legal frameworks for MPA making in Mozambique, South Africa, and Tanzania are products of established conservation experience in and outside of the three states and are certainly not paper phenomena. The three states have adopted principled approaches in their main conservation policies and legislation. All have established and managed different types of terrestrial protected areas and MPAs for many years. Admittedly, the capacity and effectiveness have been variable and these can be explained in several ways. But, there are sound practices in place such as the involvement of different levels of government, use of diverse regulatory tools, and promotion of participatory rights and processes. There are diverse, but comparable,

decision-making processes for MPA designation. Each state has different processes for MPA designation that include multiple ways on how protected areas may be established.

Despite the obvious strengths of the governance frameworks of the three states, not everything is rosy. There are significant gaps in adherence to pertinent international environmental law conventions that would support neighborly marine environmental and MPA cooperation. The institutional framework for MPAs suffers from inefficiencies. Delineation between institutional mandates is an issue in Mozambique and Tanzania where parallel mandates for MPA making are in place, contributing to overlaps and ambiguity of management roles and responsibilities. The legal definition of MPAs is also an issue in Tanzania where there is a need to more clearly define the legal and management parameters of the different MPAs permitted, notably the distinction between parks and reserves and better cross-sectoral regulation in support of MPAs. The problem may be explained, in part, by the absence of legislated duties for government agencies to coordinate the performance of their functions.

Lack of capacity is yet another issue. Mozambique has a far-reaching need for capacity building on several fronts, including better access and exchange of information on international conventions; the capacity of government to employ true integrated approaches and better interinstitutional coordination; further strengthening of environmental law (in particular, to support MPA management and enforcement); and simplification of legal documentation for public information and dissemination among communities, taking into consideration illiteracy and poverty constraints. Conflicts between legal institutions can be a problem. The experience of Tanzania also shows that customary rights are not always recognized in legislation. This is important in order to bestow legitimacy to them in the eyes of administrators. South Africa too has issues, but may not be as technically and financially constrained as the other two states. All three states evidence a weak system for review of MPA governance and evaluating management effectiveness. Mozambique and Tanzania also have weaknesses relating to access and dissemination of information to the public, uneven enforcement capabilities, and insufficiently clear conflict management processes. The consultative processes that the three states have in place suggest that a consultation process for the purpose of establishing a regional MPA network or transboundary MPAs will be a long one.

To further reinforce the national governance frameworks surveyed in this article as legal infrastructure for a transboundary MPA network and transboundary MPAs in

their border regions, the three states should consider developing legal provisions to properly mandate the respective authorities with responsibilities for the establishment and management of such transboundary arrangements. Although the legislation on domestic MPA making is clear, there is less clarity with reference to cooperative MPA making. This would be innovative legislation, which would, *inter alia*, further facilitate cross-border scientific exchanges, stakeholder participation, and surveillance and enforcement. In particular, the designation of transboundary MPAs is likely to benefit from better definition of domestic lead roles for initiating the dialogue leading to a transboundary MPA designation and eventually for continued management. Even in the event that the three states agree to establish joint commissions or similar unified structures for the management of transboundary MPAs in the two border regions, it will be important to have provisions for the definition of the roles of domestic institutions whose cooperation will be needed in what essentially will be international initiatives.

Beyond the domestic governance infrastructure, cooperation on MPAs will require a diplomatic process that was not studied in this article. The three states boast substantial international experience in transboundary resource conservation and cooperation (Guerreiro *et al.* 2009). Although this relates primarily to terrestrial contexts, there is likely much that is transferable to marine environmental cooperation such as the diplomatic processes involved, the consequential interbureaucratic cooperation required on an ongoing basis, and the range of options in achieving acceptable joint outcomes. The practice on regional MPA networks elsewhere shows that international legal agreements and a strong coordinating framework are likely to facilitate progress (UNEP/WCMC 2008). Mozambique, South Africa, and Tanzania have the capacities and aptitudes necessary to enter into bilateral, and possibly subregional arrangements, a good augur for an East African regional transboundary MPA network.

4. CONCLUSION

As Mozambique, South Africa, and Tanzania further engage in dialogue on marine conservation cooperation, to the point of scaling up their cooperation to a regional MPA network and transboundary MPAs in their border regions, they will need to consider how their domestic governance frameworks facilitate or constrain their cooperation. Although on many issues, there appears to be regional solidarity and a convergence on principles, there are significant differences concerning lead roles and institutional structures, access

to public information, and conflict management, among others, which would need to be factored in MPA cooperation. Other important factors for regional MPA cooperation include policy directions on shared concerns such as conservation and development values, with an emphasis on equitable resource use and poverty alleviation. The three states have the political will to address the difficult balance they need to strike between poverty and conservation at the domestic level. Their added challenge will be to address that balance at a regional level.

POSTSCRIPT

In October 2009 the transboundary MPA between Mozambique and South Africa discussed in this article came into existence with Mozambique's announcement of the Ponta de Ouro Marine Reserve. The MPA on the Mozambique side includes Ponta de Ouro, Inhaca, Portuguese Islands and Maputo Special Reserve to a seaward extent of three nautical miles and collectively covering an area of 678 km^2. The area has been placed on the tentative list for eventual proposal for World Heritage Site status. This MPA now links with the iSimangaliso Wetland Park on the South African side of the maritime boundary and the two MPAs together extend for 300 km. The transboundary MPA is one of five areas under the Lubombo Transfrontier Conservation Area Protocol and is considered to be the first in the African region. (iSimangaliso News & Info, online: http://isimangalisonews.wordpress.com/2009/10/29/mozambique-and-sa-link-handsacross-sea-creating-africa%e2%80%99s-largest-marine-protec-ted-area/).

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[ii] Convention on Biological Diversity, COP 7, Kuala Lumpur, 9–20 February 2004, Decision VII/28, available at http://www.cbd.int/convention/results/?id=7742&kw=2012&l0= MAR&l3=COP-07&t0=2012.

[iii] An *MPA network* is understood as "a collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve" (IUCN/WCPA 2008, at 11). A Food and Agriculture Organization of the United Nations (FAO) workshop on MPAs in fisheries management considered the concept of "network" at three levels: "at a minimum, more than one MPA; more usefully, a collection of MPAs either as representative networks and/or with some degree of connectivity which could be ecological or social, including sharing of governance resources; ideally, a synergistic system of MPAs with the 'whole greater than the sum of the parts' relative to objectives" (FAO 2006, at 5).

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[xxi] Constitutive Act of the African Union, 11 July 2000, 2158 *U.N.T.S.* 33.
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[xxiii] Treaty of the Southern African Development Community, 17 August 1992, 32 *I.L.M.* 116.
[xxiv] Protocol on Wildlife Conservation and Law Enforcement, 18 August 1999, available at http://www.sadc.int/index.php?action=a1001&page id=protocols wildlife.
[xxv] Southern African Development Community Protocol on Fisheries, 14 August 2001, available at http://www.sadc.int/index.php?action=a1001&page id=protocols fisheries—0 (21 August 2005).
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[xxvii] African Convention on the Conservation of Nature and Natural Resources, 11 July 2003, available at http://www.africa-union.org/Official documents/Treaties Conventions Protocols/ nature and natural recesource.pdf.
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[xxxv] South African Development Community Revised Protocol on Shared Watercourses, 7 August 2000, 40 *I.L.M.* 317.

[xxxvi] World Heritage Convention, supra note 7.

[xxxvii] Convention on International Trade in Endangered Species, supra note 13.

[xxxviii] Nairobi Convention, supra note 19.

[xxxix] Two of these, although coastal, are cultural sites: Stone Town of Zanzibar, a historic Swahili coastal trading center; and the Ruins of Kilwa Kisiwani and Songo Mnara, consisting of remains of historic East African ports dating back to the thirteenth and sixteenth centuries.

[xl] CBD COP7 Decision, supra note 2.

[xli] UNCLOS, supra note 8.

[xlii] *Ibid.*, arts. 5–14.

[xliii] Agreement Between the Government of the United Republic of Tanzania and the Government of the People's Republic of Mozambique Regarding the Tanzania/Mozambique Boundary, 28 December 1988, available at http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/TZA-MOZ1988TM.PDF.

[xliv] UNCLOS, supra note 8, Art. 15.

[xlv] Writing on ocean policy analysis, Underdal and Miles proposed four key questions; namely, What do we want? What should we want given our biophysical conditions? Why? How do we get there and what are we prepared to pay to get there? (Underdal 1980; Miles 1992). This analytical approach is also applicable to analysis of MPA policies.

[xlvi] At the end of 2008, none of the three states ranked in the "high human development" category of the Human Development Index. South Africa (125) and Tanzania (152) are in the medium rank, and Mozambique (175) is in the low development rank, out of 179. UNDP, Human Development Reports (2008), available at hdr.undp.org/en/statistics/.

[xlvii] A distinction is maintained between marine parks and marine reserves. A *marine reserve* is an area where some resource use is permitted, but subject to restrictions. A *marine park* is a type of reserve where community use and habitation are permitted on the basis of a strict zonation scheme and participatory management. Marine Parks and Reserves, Tanzania, available at www.marineparktz.com/faq.htm.

[xlviii] Tsistikamma National Park in South Africa was proclaimed as an MPA (marine national park) in 1964. It is a no-take zone and extends seaward by 5 kilometers to include intertidal life, reefs, and deep sea fish. South Africa National Parks, available at http://www.sanparks.org/parks/tsitsikamma/tourism/history.php.

[xlix] As reported by Ministério para a Coordenação da Acção Ambiental, Centro de Desenvolvimento Sustentável para as Zonas Costeiras, available at http://www.zonascosteiras.gov.mz/article.php3?id article=5.

6. INTERNATIONAL ENVIRONMENTAL INSTRUMENTS

Guerreiro, J., Chircop, A., Dzidzornu, D., **GRILO, C.**, Ribeiro, R., van der Elst, R. and Viras, A. (2011). "The Role of International Environmental Instruments in Enhancing Transboundary Marine Protected Areas: An Approach in East Africa", *Marine Policy* 35(2):95-104.

Abstract: The increasing degradation of marine ecosystems has led to multiple calls for greater protection through the establishment of marine protected areas (MPAs). If created at the ecosystem or ecoregion level, MPAs will likely straddle maritime boundaries and therefore necessitate international cooperation. International environmental law and international law of the sea may facilitate cooperation between States in creating transboundary MPAs. The extent to which this body of law is actually or potentially useful for the establishment of transboundary MPAs is examined in the context of the East African Marine Ecoregion, focusing on Mozambique, South Africa, and Tanzania. A general survey and assessment of the applicable global, regional, and bilateral instruments in relation to the three States is conducted. Although some global instruments are relevant in the East African context, regional and bilateral instruments are more conducive to the establishment of transboundary MPAs. The article concludes that although a trilateral agreement between Mozambique, South Africa, and Tanzania would be an ideal vehicle for the establishment of a transboundary network of MPAs addressing both national and ecoregional conservation interests, a separate solution at each border will be the first step towards this goal.

Keywords: transboundary marine protected areas, International environmental instruments, East African marine ecoregion.

1. INTRODUCTION

Global nature conservation met a turning point with the adoption of the Convention on Biological Diversity, 1992 (CBD) [1], which calls for *in situ* protection. CBD goals include the range conservation of at least 10% of the world's ecological regions by 2010, while the target date for marine protected areas (MPAs) is 2012 [2]. Adopted under the CBD, the Jakarta Mandate [3] further commits State Parties to the conservation of marine

and coastal biodiversity. The International Union for Conservation of Nature (IUCN) called for a global representative system of MPAs at the World Summit on Sustainable Development (WSSD) [4], reinforcing the Jakarta Mandate [5]. Nonetheless, the spatial extent of marine conservation efforts amounts to less than 1% of the total marine surface [6].

These figures suggest that greater efforts at national and international levels are needed for MPA targets to be met. In marine ecoregions and large marine ecosystems (LMEs)[21] straddling inter-state terrestrial and maritime boundaries, the lack of a shared common approach and strategy concerning marine biodiversity conservation is partly responsible for the poor record to date. International organizations recognize that the road towards a "global representative system" depends on international cooperation, at least at the level of the ecoregion.[22] Transboundary conservation[23] mechanisms such as transboundary MPAs,[24] particularly transboundary networks of MPAs,[25] have the potential to assist States in meeting these international marine conservation targets.[26] International environmental law and the international law of the sea can be expected to facilitate cooperation between States in establishing transboundary MPAs.

This article examines these marine conservation issues in the context of the East African marine ecoregion (EAME), involving Mozambique, South Africa, and

[21] Sherman [7] defines LMEs as "relatively large regions on the order of 200,000 km^2 or larger, characterized by distinct bathymetry, hydrography, productivity, and trophically dependent populations".
[22] The World Wildlife Fund (WWF) defines an ecoregion as "a geographic area that contains a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions, and which functions effectively as a conservation unit" [8].
[23] The first transboundary protected area was established in 1932, the Waterton-Glacier International Peace Park, between the United States and Canada, and comprises previously established national parks in each State.
[24] Hereinafter, references to transboundary MPAs include transboundary networks of MPAs unless otherwise specified.
[25] A network of MPAs is "a collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve" [9]. A transboundary network of MPAs straddles international maritime boundaries; however, the individual MPAs within the network may lie entirely on either side of the maritime boundary.
[26] Sandwith *et al.* [10] define a transboundary protected area as "An area of land/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituting parts are especially dedicated to the protection and maintenance of biological biodiversity, and of natural and associated cultural resources, and managed cooperatively through legal and other effective means".

Tanzania.[27] Currently, there are initiatives to establish transboundary networks of MPAs involving Mozambique and Tanzania, and Mozambique and South Africa (hereinafter referred to as the transboundary sites). Three main questions are considered: (i) What elements of global, regional, and bilateral legal instruments potentially support the implementation of transboundary networks of MPAs in the transboundary sites?; (ii) To what extent do these instruments apply to the three States?; and (iii) How can applicable instruments support the establishment and management of transboundary networks of MPAs? The usefulness of these instruments and the East African record in their regard are assessed from the perspective of their relevance for the establishment of transboundary MPAs in the EAME.

2. THE CONTEXT

2.1. The Eastern African marine ecoregion

The EAME includes areas considered to be in near-pristine condition. It extends for over 4.600 km and covers an estimated 540.900 km^2, including the 200 nautical mile (nm) exclusive economic zones (EEZs) of Somalia, Kenya, Tanzania, Mozambique, and South Africa. The ecoregion directly supports 21.5 million people who depend on goods and benefits from the coastal zone [6]. However, several habitats and species are under heavy pressure, including mangroves, coral reefs, seagrass beds, dugongs, turtles, and sharks.[28] Protection of these habitats and species has become the focus of international attention and cooperation, making EAME a priority area for transboundary networks of MPAs. The region has a long history of marine environmental protection initiatives at the national level, e.g., Inhaca and the Portuguese Islands MPAs (Mozambique, 1965); Tsitsikamma National Park (South Africa, 1968); Watamu Marine National Park and Malindi-Watamu Marine National Reserve (Kenya, 1968); and Dar es Salaam Reserves (Tanzania, 1975) [12].

It appears that Kenya, Tanzania, and Mozambique are well on the road to meeting the CBD target, with Kenya having designated 8.7% of its continental shelf as a MPA,

[27] This study was carried out under the EU Project "Transboundary networks of marine protected areas for integrated conservation and sustainable development: biophysical, socio-economic and governance assessment in East Africa" (TRANS- MAP), INCO-CT2004-510862.

[28] Sharks and other fished species (mackerel, small pelagic fish, lobsters, and shrimps) are likely to be transboundary [11].

Tanzania 7.7%, and Mozambique 4% [13]. In 2003, Tanzania committed to expanding its marine protected areas to 10% by 2010 [13]. Mozambique has also declared its intention to implement transboundary reserves with South Africa (which is the present situation) and Tanzania. South Africa recently claimed that 15% of its coast is covered by MPAs as a result of the declaration of four MPAs in 2004 [14].

2.2. The border areas

Transboundary site-specific features, such as geography, ecological concerns, socio-economic dynamics, and jurisdictional matters, collectively define the conditions for transboundary MPA-making efforts.[29] As the "middle State", Mozambique is key to the creation of a regional transboundary MPA network. The challenge remains to develop cooperative transboundary conservation mechanisms, as well as to ensure connectivity and effective management.

The Ruvuma River defines the border between Mozambique and Tanzania (Fig.1). A natural frontier, local communities freely cross the river and families have cross-border ethnic and kinship ties. In Tanzania, the Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP) is located across from the border with Mozambique, while the Quirimbas National Park (QNP) in Mozambique is 175 km distant from the border. Essentially an archipelagic configuration, this area is well-known for its high tropical biodiversity as well as the presence of vulnerable biota including coral reefs, sea turtles, humpback whales, dolphins (bottlenose, humpback, spinner, and spotted), and dugongs. Tourism, a growing economic force on the islands, threatens to exclude fishermen from traditional productive sites. Fishing is often a transboundary activity.

The Mozambique and South Africa border area, characterised by some of the world's highest coastal sand dunes and sandy beaches, stretches from Maputo Bay to Ponta do Ouro and further down to the iSimangaliso Wetland Park (IWP, formerly Greater St. Lucia Wetland Park) (Fig. 2).[30] Wetlands, including Lake St. Lucia, arguably comprise the largest estuarine system in Africa. Coral reefs here are amongst the most southerly in the world. Coelacanth populations in the IWP alone justify the existence of an MPA as the area provides ideal habitats. Sea turtles, mainly loggerhead and

[29] The TRANSMAP Project analyzed and published reports on each of these aspects.
[30] Kosi Bay and the GSLWP are less than 20 and 150 km, respectively, from the border with Mozambique.

leatherback, nest on the sandy beaches between Mabibi and Kosi in South Africa, and from Ponta do Ouro to Inhaca Island in Mozambique.

Ponta do Ouro Partial Marine Reserve, with an area of 678 km^2, was declared by Decree no. 42/2009, for the "preservation and protection of marine and coastal species and their habitats" [15]. Stretching 3 nm into the Indian Ocean, its long sandy beaches and coral reefs provide an important feeding area for turtles, dugongs, and migratory birds. It is considered one of the eight key biodiversity sites (seascapes) of global importance within EAME [16].

Cetaceans are either seasonal migrants, e.g., humpback whales, or semi-resident populations, e.g., humpback and bottlenose dolphins. Whale sharks also live in this transboundary area. Saw fish, once common, are now considered critically endangered [17], and recent studies treat this species as extinct in South African waters. As in the north border area, tourism is an economic driver with the Lubombo Tourism Route, proposed under the Lubombo Spatial Development Initiative, expected to attract 1.4 million tourists to the transboundary area by 2010 [18].

2.3. Maritime zones and boundaries

Mozambique, South Africa, and Tanzania have established maritime zones and boundaries in accordance with the United Nations Convention on the Law of the Sea, 1982 (UNCLOS) [19]. Mozambique and South Africa have delineated straight baselines (in addition to the normal baseline based on the low watermark); Tanzania has only adopted the normal baseline. All three States have declared 12 nm territorial seas. Both Mozambique and South Africa claim a 24 nm contiguous zone, which South Africa also considers as a maritime cultural zone for the protection of objects of an archaeological or historical nature. For no clear reason, Tanzania has not exercised its right to declare a contiguous zone. Each State has declared a 200 nm EEZ. Both Mozambique and South Africa have enacted continental shelf legislation consistent with UNCLOS. Tanzanian legislation only refers to the EEZ.

The maritime boundary between Mozambique and Tanzania has been long settled by treaty [20]. The potential boundary between Mozambique and South Africa remains undelimited.

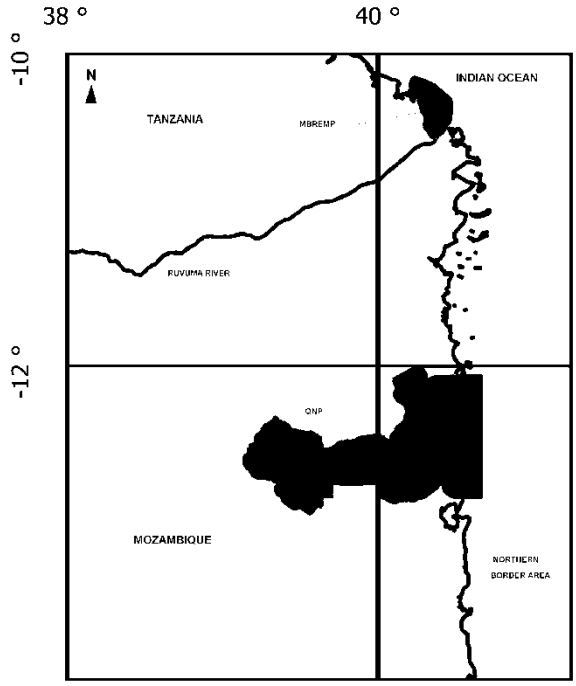

Figure 1 - Border area between Mozambique and Tanzania (Source: adapted from Transmap Internet MapServer (http://internal.bio3.pt/transmap/default.asp, as of 21 April 2009)). Description: Fig.1 shows the northern border area, with the terrestrial boundary between the two countries defined by the Ruvuma river. Existing MPAs are also shown, namely the MBREMP in Tanzania, located immediately across from the border with Mozambique, and the QNP in Mozambique, which is 175 km distant from the border. Legend: MBREMP—Mnazi Bay-Ruvuma Estuary Marine Park. QNP—Quirimbas National Park.

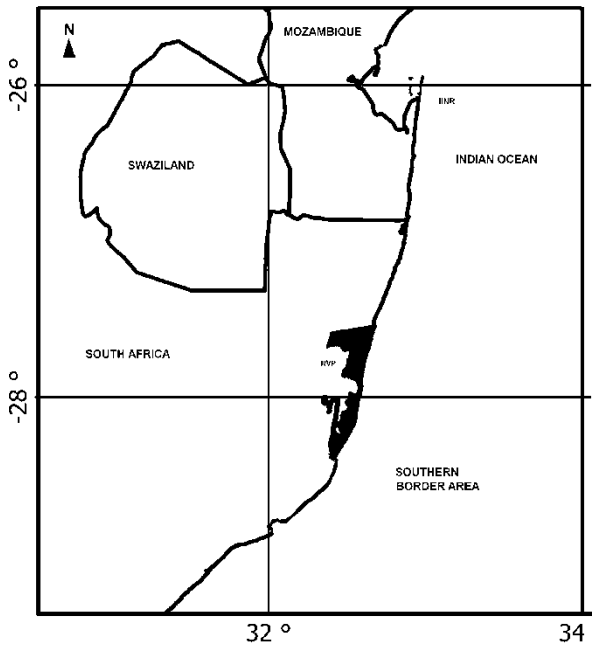

Figure 2 - Border area between Mozambique and South Africa (Source: adapted from Transmap Internet MapServer (http://internal.bio3.pt/transmap/default.asp, as of 21 April 2009)). Description: Fig.2 shows the southern border area, between Mozambique and South Africa. Existing MPAs are also shown, namely the IINR and the POPMR, in Mozambique and the IWP in South Africa. Legend: IINR—Inhaca Island Natural Reserve. IWP—iSimangaliso Wetland Park (formerly Greater St. Lucia Wetland Park, GSLWP). POPMR—Ponta do Ouro Partial Marine Reserve.

2.4. Existing MPAs

There are no "real" transboundary networks of MPAs, or transboundary MPAs (with joint administration) between the three States.[31] However, each State has taken steps at a national level to further a "transboundary approach".

In 2000, Tanzania established the MBREMP, and its general management plan was approved in 2005. In 2003, Mozambique established Quirimbas National Park (QNP), with 20% of its 750.639 ha comprised of marine and island habitats. This effort was complemented by the expansion of an old MPA (Bazaruto National Park), which became one of the largest in the region. Mozambique and Tanzania have identified establishment of transboundary MPAs as a priority activity of Tanzania's Marine and Coastal Environmental Management Project (MACEMP) [22]. Mozambique is also sponsoring studies on the framework and action plan for a transfrontier conservation area between Mozambique and Tanzania (Mtwara-Quirimbas Complex).[32]

On the southern border, South Africa has long-established IWP. Mozambique's Inhaca Island Natural Reserve is one of Africa's oldest MPAs. In 2000, the two countries concluded a protocol to establish the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area (TFCRA) [24].[33] The most recent MPA, established in August 2009, the Ponta do Ouro Partial Marine Reserve, includes the Inhaca and Portuguese islands and the Maputo Special Reserve. In October 2009, a transboundary MPA was declared under the Lubombo Protocol. This transboundary area extends 300 km, from Maputo Bay in Mozambique, to Cape St. Lucia in South Africa (the southern boundary of the IWP), linking the Ponta do Ouro Partial Marine Reserve to IWP. Thus, national protected areas at their respective borders form this transboundary

[31] Effective transboundary MPAs or networks of MPAs would provide: (i) a joint management team or commission from the States involved; (ii) a common/ single management plan with common goals; and (iii) a commitment to pursue similar regulations on each side of the border(s). A joint declaration supporting a transboundary MPA, together with the creation of MPAs on each side of the border and transfrontier task teams, are usually the first steps in establishing a transboundary MPA network. These aspects are analyzed in another article [21].

[32] This includes Mnazi Bay, the Ruvuma Delta, Mocimboa da Praia, Pemba Bay, and Quirimbas Archipelago as well as economic development initiatives (e.g., the Mtwara Corridor Development Project) [23].

[33] This is one of five protocols under the 2000 General Trans-Frontier Conservation and Resource Area Protocol between Mozambique, South Africa, and Swaziland. This general protocol defines a TFCRA as a "geographical area divided by one or more international political borders, which is identified by two or more of the Parties (...) to be subject to TFCRA management".

MPA. Finally, the Great Limpopo Transfrontier Park, established by a 2002 trilateral treaty with Zimbabwe, also contributes to transboundary conservation in this region [25].

3. LEGAL FRAMEWORK FOR MARINE PROTECTED AREAS

Global, regional, and bilateral legal instruments can facilitate the establishment of MPAs in East Africa at three levels:

(1) providing for the establishment of PAs (and by inference, MPAs);

(2) providing measures and tools that facilitate the establishment and/or management of MPAs; and

(3) setting out a framework conducive to the establishment and management of MPAs, e.g., environmental protection.

3.1. Global instruments

3.1.1. United Nations Convention on the Law of the Sea (UNCLOS)

All three States are Parties to UNCLOS. UNCLOS includes general provisions such as unity of the oceans, an integrated approach to marine conservation and management, as well as provisions for international cooperation.

Although Part XII on the protection and preservation of the marine environment emphasizes global and regional cooperation, it does not specifically address MPAs. Article 194(5) [26], however, calls on States to adopt measures that form the basis for MPAs, namely “to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life.”

Other UNCLOS provisions, e.g., Article 21(1), allow a coastal State to establish standards for international shipping in the vicinity of or within MPAs in conformity with UNCLOS and the international standards adopted through the International Maritime Organization (IMO) [27]. For exceptionally sensitive marine areas, Article 211(6) further provides that States can ask IMO to adopt special mandatory measures for the prevention of pollution from international shipping within an area of their EEZ.

Within the EEZ, coastal States have rights over, *inter alia*, living marine resources (Article56(1)). Articles 63 and 64 facilitate the conservation and management of straddling stocks and highly migratory species through appropriate regional organisations.

The FAO Code of Conduct for Responsible Fisheries further promotes sustainable fishing practices in marine waters [28].

3.1.2. Convention on biological diversity (CBD)

The CBD [1] and the Jakarta Mandate framework for a systemic approach to the establishment and management of marine PAs is consistent with the provisions UNCLOS. As States Parties to the CBD, the three States are obliged, "as far as possible and as appropriate, [to] establish a system of protected areas or areas where special measures need to be undertaken to conserve biological diversity" (Article8(a)), including the transboundary areas discussed here. The 2004 Principles and Guidelines for the Sustainable Use of Biodiversity (the Addis Ababa Principles) [29], call on States sharing transboundary resources to engage in joint ecosystem management and decision-making arrangements (Practical Principle 7) and to adopt cooperative bilateral or multilateral arrangements where habitats and/or resources straddle two or more States (Practical Principle 8).

3.1.3. Convention on wetlands of international importance especially as waterfowl habitat (Ramsar Convention)

The Ramsar Convention [30] supports the establishment of MPAs in coastal wetlands with mangroves, coral reefs, and seagrass beds. Of the 25 Ramsar sites in these three State Parties, four are located in the border area of South Africa.[34]

Ramsar calls on State Parties to cooperate in managing transboundary wetlands and to coordinate policies where watercourses exist [31]. Resolution VIII.32 elaborates on State Parties' plans for conservation, integrated management, and sustainable use of mangrove ecosystems and their resources [32]. Ramsar also promotes regional strategies for mangrove conservation, supporting the three States' efforts to coordinate habitat conservation. Finally, Ramsar Resolution VIII.44 addresses the integration of the New Partnership for Africa's Development (NEPAD)[35] and Ramsar in Africa [35], particularly in the transboundary context.

[34] The four Ramsar sites are St. Lucia System, Kosi Bay, Lake Sibaya, and Turtle Beaches/Coral Reefs of Tongaland.

[35] The African Union adopted the NEPAD programme for social and economic development in Africa in 2002 [33]. Ramsar Resolution VIII.44 calls on African Contracting Parties to use NEPAD to implement the Ramsar Strategic Plan [34], in particular, transboundary initiatives

3.1.4. Convention on the conservation of migratory species of wild Animals (CMS)

The CMS provides for international cooperation in the protection of particular migratory species and their habitat, especially those listed in its two appendices [36]. Appendix 1 marine species found in the two transboundary sites include humpback and blue whales, and green, hawksbill, olive ridley, loggerhead, and leatherback turtles. Under the CMS, the duties of "range States" for these species include conservation, restoration and protection of habitat and migratory routes, as well as limitations on exploitation with exceptions accommodating traditional subsistence users. State Parties are to "endeavour to conclude" conservation and management agreements for Appendix II species, which include dugongs, humpback dolphins, and whale sharks (Article 2(3)(c)). Mozambique, Tanzania, and South Africa are range States for one or more of the listed species, and all three are Parties to the CMS.

Three species-specific CMS agreements are relevant for the two transboundary sites. A transboundary MPA network could contribute to the conservation and habitat protection goals of the Agreement on the Conservation of African-Eurasian Migratory Waterbirds, 1995 (AEWA) [37,38] for listed species such as the African open bill (*Anastomus lamelligerus*) and African spoon bill (*Platalea alba*). Only Mozambique is not a Party to the AEWA.

All three States are signatories to a memorandum of understanding (MoU) concerning conservation and management of marine turtles and their habitats (IOSEA MoU) [39], which calls for regional and international cooperation "in the establishment of transboundary marine protected areas using ecological rather than political boundaries" for listed species. A similar MoU concerning dugongs [40] integrates the CMS and CITES lists and emphasises "ecosystem-based management (e.g., networks of marine protected areas)" (Objective 3). Like the IOSEA MoU, transboundary MPAs that prioritise ecological boundaries are encouraged (Objective 6). Of the three countries, only Tanzania is a signatory.

3.1.5. Convention on international trade in endangered species of wild fauna and flora (CITES)

A transboundary network of MPAs in the East Africa region would meet CITES calls for State Parties to cooperate in combating the illegal trade in endangered species, a problem

experienced by each of the States considered here. The three States are Parties to CITES [41].

3.1.6. International convention for the regulation of whaling (ICRW)

ICRW [42] was one of the earliest international agreements to call for the establishment of MPAs by providing for the adoption of "regulations with respect to the conservation and utilisation of whale resources, fixing open and closed waters, including the designation of sanctuary areas" (Article V,1) [43]. The EAME region has at least 39 species of cetaceans, including the highly vulnerable blue whale [44] and vulnerable species such as humpback, Bryde's, and southern right whales. In addition, several cetaceans are threatened through interactions with commercial fisheries. However, only South Africa is a Party to the ICRW. Mozambique and Tanzania would need to make a political commitment to cooperate with each other and South Africa and designate sanctuaries in the two transboundary sites for ICRW to support transboundary conservation in this region.

3.1.7. Convention concerning the protection of the world cultural and natural heritage (WHC)

The WHC [45] could provide another level of protection to cultural and natural heritage sites in the transboundary area as all three States are Parties. Where natural heritage sites are already established, future MPAs in those areas would benefit from the heritage protection. Prior to the declaration of the Ponta do Ouro Partial Marine Reserve, Mozambique made a submission to the World Heritage Committee for its inclusion on the World Heritage List.[36] Mozambique has also submitted the Quirimbas Archipelago for inclusion on the World Heritage List.[37] The IWP, a designated South African natural heritage site since 1999, is a candidate for inclusion in a transboundary network of MPAs between Mozambique and South Africa. If the Ponta do Ouro Reserve is designated, together with IWP, it would form Africa's first transboundary marine World Heritage Site [47].

[36] Submitted on 28th August, 2008, under the Criteria (vii) and (x) and Category "Natural" (Ref.:5382) by the Mozambique National Directorate for Culture, Ministry of Education and Culture [16].
[37] Submitted on 28th August, 2008, under the Criteria (ii), (iv) and (x) and Category "Mixed" (Ref.:5380) [46].

3.1.8. International convention for the prevention of pollution from ships (MARPOL)

MARPOL [48] Annexes I, II, and V provide for the designation of “special areas” by IMO for the prevention of sea pollution [49]. MARPOL includes provisions that would constitute an important tool for the protection of the marine environment within an MPA and give international status to those areas [50]. All three East African States are Parties to MARPOL, but not to all five of its annexes. Mozambique and Tanzania are Parties to Annexes I–V inclusive; South Africa is Party to all except Annex IV. Currently, there are no special areas in the two transboundary sites; the nearest, designated under Annex 1, is further south in South Africa [51].

Separately from MARPOL, but also through the IMO, MPAs in a transboundary network could be designated as a particularly sensitive sea area (PSSA) where further shipping control measures might apply, such as navigation routing and certain areas to be avoided [52,53]. Additional measures concerning the safety of navigation may be permissible under the International Convention for the Safety of Life at Sea, 1974 (SOLAS) [54]. Although there are no PSSAs in African waters, a PSSA layered over an existing MPA would assist East African States with the management of transboundary MPAs, as has been demonstrated in the Wadden Sea.

3.1.9. Other instruments

Other international instruments could play a complementary role to MPA-making and management in one of two ways. First, there are instruments that can appropriately be described as contextual. The United Nations Framework Convention on Climate Change [55], together with the Kyoto Protocol [56], is one example to which all three States are Parties. Actions taken to reduce carbon dioxide and other greenhouse gas emissions indirectly benefit an MPA. At the same time, an MPA builds resilience in ecosystems so they can adapt to climate and related physical change [57]. The Convention on the Law of the Non-navigational Uses of International Watercourses [58], addresses non-navigational uses of rivers based on the principle of equitable utilisation [59], including protection of the downstream marine environment and estuaries, nevertheless only South Africa is a Party.

The global programme of action for the protection of the marine environment from land-based activities (GPA) [60] combats this significant problem through integrated coastal management (ICM) [61]. The programme includes marine pollution

and legal framework assessments and an initiative to develop a new land-based marine pollution protocol under the Nairobi Convention of the East African Regional Seas Programme [62].

A second category of international instruments are those controlling vessel source pollution. Reference has already been made to SOLAS and MARPOL. The International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) [63] provides a framework for joint oil spill contingency planning and response in combating accidental pollution. Mozambique, Tanzania, and South Africa are Parties to OPRC. Similarly a transboundary MPA network could benefit from the cooperative regulation of dumping of wastes in or in the vicinity of protected areas under the London Convention [64]. Tanzania and South Africa are Parties; however, only South Africa is a Party to its 1996 Protocol [65].

3.2. Regional instruments

3.2.1. African convention for the conservation of nature and natural resources

This convention [66] was adopted to preserve the unique biodiversity of Africa and to enhance human well-being. However, it has little to say about transboundary cooperation and simply provides a brief reference to bilateral and multilateral cooperation (Article XVI). Tanzania and Mozambique are Parties, but South Africa has not yet ratified it. The Convention was revised following the WSSD to provide for cooperative management of transboundary resources or ecosystems through the establishment of inter-State commissions [67]. Although not yet in force, and none of the three States have ratified it, Tanzania and Mozambique signed the revised Convention which sets the ground for more localized approaches to marine conservation.

3.2.2. Eastern African regional programme (EARP)

Since 1980, the EARP [68] has worked with relevant United Nations agencies and governments in the management and conservation of the resources of the region [69]. Four legal instruments shape marine conservation initiatives in the region: (i) the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region (Eastern African Action Plan); (ii) the Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region,1985 (Nairobi Convention); (iii) the Protocol

Concerning Cooperation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region, 1985 (Marine Pollution Protocol); and (iv) the Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985 (Protected Areas Protocol). A new protocol concerning pollution from land-based activities is under development.

EARP has been criticized for not setting outcomes or standards to be met by State Parties. Nevertheless, elements of the Action Plan support the establishment of transboundary MPAs, particularly those strengthening the ability of governments to adopt environmental management policies through cooperation in establishing protected areas, training, and mapping (Article 9).

The Nairobi Convention [70], together with its two protocols, is the only regional legal instrument to specifically address marine conservation issues. The Convention sets out measures for the establishment of protected areas in marine and coastal habitats and for the reduction and avoidance of marine pollution. The stipulation for the individual or joint establishment of "specially protected areas" opens the way for transboundary conservation initiatives. All three States have ratified the Convention and both of the Protocols.

The Marine Pollution Protocol [71] addresses marine pollution and recommends the adoption of bilateral or multilateral sub-regional agreements to give effect to its provisions (Article 8). Such actions include contingency plans within MPAs or an MPA network, or communication mechanisms between MPA authorities and the responsible national authority.

The Protected Areas Protocol [72] is the keystone of the Nairobi instruments insofar as MPAs are concerned. It calls for measures to "maintain essential ecological processes and life support systems" (Article 2), including the development of national conservation strategies and management plans (Article 5). Article 10 obliges State Parties to take individual or joint measures to preserve rare and fragile ecosystems and species. The Protocol lists flora (Annex I), fauna (Annex II), harvestable species of wild fauna (Annex III), and migratory species (Annex IV) that require a level of special protection, including dugongs, humpback and blue whales, and several marine turtle species. More importantly, it provides a potential legal basis for the creation of transboundary PAs in

East Africa.[38] In particular, Article 13 on Frontier Protected Areas establishes a duty for State Parties wishing to establish a PA in an area contiguous to the frontier of another State to engage in consultation with that State and, *inter alia*, "examine the possibility of establishment by the other Party of a corresponding protected area or buffer area."

3.2.3. Treaty establishing the African economic community and related sub-regional agreements (AEC)

The AEC (1991) [73] includes general provisions for harmonisation of natural resource and environmental protection policies between State Parties (Article 4(2)). All three States are Parties.

Established under AEC, the recently revived East African Community (EAC) [74] provides for the adoption of common wildlife conservation policies and the development of "common management plans for transborder protected areas" (Article 116). Nevertheless, only Tanzania is a member of the EAC.

3.2.4. Treaty of the Southern African development community (SADC)

One of SADC's (1992) main environmental objectives is achieving "sustainable utilization of natural resources and effective protection of the environment" (Article 5) [75]. The high-level integration and policy coordination functions accorded to the Integrated Committee of Ministers in, *inter alia*, natural resource management, could facilitate the establishment of transboundary MPAs. All three States are members of SADC and have ratified its Treaty and respective protocols.

The SADC Protocol on Wildlife Conservation and Law Enforcement, 1999 (SADC Wildlife Protocol) [76] inextricably links conservation and development efforts and calls for cooperation between State Parties to manage shared wildlife resources and the "transfrontier effects of activities within their jurisdiction or control." It provides the first definition of a "transboundary conservation area" for East Africa[39] with requirements for harmonized legislation on wildlife use and conservation (Article 4).

[38] Establishment of protected areas is based on: (i) natural habitats; (ii) migration routes; (iii) areas necessary for economically important marine species; (iv) reserves of genetic resources; (v) rare or fragile ecosystems; and/or (vi) areas of interest for scientific research and monitoring.

[39] Transfrontier conservation area is defined as the "area or the component of a large ecological region that straddles the boundaries of two or more countries, encompassing one or more protected areas, as well as multiple resources use areas" (Article 1).

The SADC Protocol on Shared Watercourses, 2000 seeks "to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilization of shared watercourses" [77]. Cooperative management of the Ruvuma River and its estuary at the south border, and the several rivers crossing the north border, would have a beneficial impact on the water quality of any transboundary MPA.

The SADC Protocol on Fisheries, 2001 calls on State Parties to promote sustainable use of living aquatic resources and ecosystems [78] and to coordinate the establishment of MPAs, particularly with reference to critical habitats and endangered species, and migratory species in transboundary areas (Article 14). It calls for joint research programmes on shared resources and common scientific problems (Article 17). The Protocol implicitly recognises the need to protect endangered species in transboundary areas.

3.2.5. Other instruments

INFOPÊCHE[40] [79], the Western Indian Ocean Tuna Commission [80], and the Lusaka Agreement on Cooperative Enforcement Operations Directed at Illegal Trade in Wild Fauna and Flora, 1994 are considered to play a complementary role. Of the three States, only Tanzania is not a member of INFOPÊCHE. The Western Indian Ocean Tuna Commission's main objective is the conservation and management of tuna stocks of the Indian Ocean. Currently, only Tanzania is a Party; South Africa is a cooperating non-contracting Party. The Lusaka Agreement [81] establishes a permanent Task Force and provides for the creation of National Bureaus responsible for the implementation of the Agreement at the national level. The Agreement's management area includes "marine and coastal areas within the limits of national jurisdiction of the Parties" (Article 1), however, the Task Force's activities seem to have only targeted terrestrial species.

3.3. Bilateral cooperation

One of the main sub-regional initiatives facilitating the establishment of transboundary protected areas is the General Trans-Frontier Conservation and Resource Area Protocol, 2000 [82] between Mozambique, South Africa, and Swaziland. The Protocol defines Transfrontier Conservation and Resource Areas (TFCRAs) and calls for "the

[40] INFOPÊCHE refers to the Agreement for the Establishment of the Intergovernmental Organization for Marketing Information and Cooperation Services for Fishery Products inAfrica.

development of joint strategies… for trans-frontier ecological planning and resources management...” A TFCRA Commission, with members designated by the ministers of the Parties, reports to the Ministers’ Committee, and recommends measures and policies necessary to achieve the Protocol’s goals.

To date, four bilateral and one trilateral protocols have been signed under the general TFCRA Protocol. The Lubombo-Kosi Bay TFCRA [24] establishes a transboundary MPA that stretches from Maputo Bay, linking the Ponta do Ouro Marine Partial Reserve (which includes the Inhaca Island Natural Reserve and the marine component of the Maputo Elephant Reserve), in Mozambique, to the IWP in South Africa, as well as intervening MPAs in South Africa. A transfrontier task team, integrating relevant agencies from both countries coordinates oversight of shared resources [83].

At the northern border, the Mtwara Development Corridor (MtDC), a transboundary initiative of Tanzania with Mozambique, Malawi, and Zambia, promotes investment in infrastructure. Projects to enhance transboundary collaboration in natural resource management and World Heritage Sites are being studied, although joint resource management remains a concern [84].

4. DISCUSSION

Each of the global, regional, and bilateral instruments to which Mozambique, South Africa, and Tanzania are Parties, despite their shortcomings, offers opportunities for furthering transboundary marine cooperation and MPA-making. UNCLOS and the CBD provide the necessary legal foundation for the establishment of MPAs and a framework for transboundary networks of MPAs. UNCLOS sets out the coastal State jurisdictional framework in the territorial sea and EEZ, and for marine environmental protection and preservation rights and responsibilities. CBD establishes the basic principles and approaches to marine conservation at the genetic, species, and ecosystem levels. The three States are able to pursue CBD objectives by exercising the authority and control they enjoy in their maritime zones through UNCLOS. Although Tanzania has not fully maximized its benefits from UNCLOS, this shortcoming is not an impediment to MPA-making and transboundary marine cooperation. However, coastal States are subject to some limitations under UNCLOS, especially with respect to international shipping, which is subject to additional international standards and rules. The weak protection accorded

marine biological diversity under UNCLOS is offset by the measures provided under the CBD.

In relation to MPA establishment, several global instruments overlap to some extent. The duty to undertake *in situ* conservation in the CBD, including the Jakarta Mandate commitments for coastal and marine conservation, is a clear mandate for the establishment of MPAs. The call for cooperation accommodates transboundary MPAs and transboundary networks of MPAs. Although concluded decades apart, Ramsar and the World Heritage Conventions also provide for site-specific conservation measures, raising questions as to the efficiency of conservation efforts at the same site. It is not uncommon for a conservation site to be a national MPA, as well as a Ramsar and/or WHC site. There is, perhaps, a need for convergence among international regimes to minimize potential inefficiencies. This overlap can be rationalised by considering the particular function that each instrument serves. As a framework instrument, the CBD sets out general principles. The Ramsar Convention focuses on particular conservation sites, namely, wetlands of international importance. With their international status, Ramsar sites are prestigious and elicit international recognition, attracting technical and financial support, thereby providing an incentive to governments to establish or reinforce MPAs in wetlands. To some extent, the WHC can be rationalized as giving protection to sites that also deserve international recognition and technical and funding assistance. However, where a WHC site is a wetland of international importance, the duplicity cannot be easily explained. Even so, the three East African States might still find political (if not economic) value in multiple conservation designations for the same site. For example, South Africa's GSLWP, as well as Tanzania's Mnazi Bay-Ruvuma Estuary Marine Park and Mozambique's Quirimbas National Park in the north and the recently designated Ponta do Ouro Partial Marine Reserve in the south, possess natural and cultural values that may well qualify them for WHC designation, in addition to the protection offered under the CBD.

The international protected areas regime is reinforced by regional level conventions to which the three States are Parties. The African Convention for the Conservation of Nature and Natural Resources could serve as a regional legal umbrella for implementing transboundary MPAs, particularly considering its post-WSSD amendments concerning cooperative management of ecosystems and establishment of inter-State commissions. However, the revised convention is not yet in force, and South

Africa has not signed it yet. The Nairobi Convention and its protocols translate global commitments into regional marine conservation measures and initiatives for the establishment of marine and coastal protected areas. In particular, the Protected Areas Protocol highlights the need for protection of natural habitats and genetic resources and includes provisions for Frontier Protected Areas at international border areas. Thus, in addition to establishing national MPAs, the East African States are also promoting the establishment of transboundary MPAs on a bilateral basis in this regional instrument [85].[41]

There is also some measure of duplication at the regional level, this time between the Nairobi Convention Protected Areas Protocol and the SADC Wildlife Protocol. The SADC Protocol also provides for regional transboundary conservation areas and a harmonised wildlife use and conservation legal regime. However, the Protocol's institutional structure, including the Committee of Ministers for Food, Agriculture and Natural Resources that is responsible for adopting regional wildlife policies and the Protocol's Wildlife Conservation Fund, provide both a political mandate and funding mechanism for regional transboundary nature conservation policy.

Other global and regional instruments provide useful tools for MPA management. MARPOL special area designation (regarding oil pollution, noxious substances, and garbage); SOLAS routing and reporting measures, PSSA designation, and appropriate protective measures; and OPRC contingency planning and response are of note, especially because the three States, with the exception of South Africa, have made little, if any, use of the opportunities afforded by these measures. This is unfortunate given the evidence of illegal discharges related to international shipping, including oily ballast water, in coastal areas of the region. If a transboundary MPA or a transboundary network of MPAs were designated between Tanzania and Mozambique, following the example of the transboundary marine protected area established between Mozambique and South Africa, or if a transboundary network of MPAs was designated between Tanzania and Mozambique and Mozambique and South Africa, the three States would be able to approach the IMO with a joint proposal for PSSA designation or special area designation

[41] E.g., the Ponta do Ouro Partial Marine Reserve in Mozambique forming a TBMPA with the IWP in South Africa.

under MARPOL Annexes I, II, and V. Such additional measures would be useful, particularly in sensitive habitats.

Perhaps even more than shipping, fishing is a major issue that must be addressed when establishing an MPA. Unfortunately, there are few suitable tools available, especially in areas where poverty alleviation and alternative sources of livelihood are fundamental local concerns [86]. At the global level, apart from UNCLOS and the CBD, sustainable fisheries management principles, rules, and processes with mandatory application in national maritime zones are limited. The FAO Code of Conduct for Responsible Fisheries has achieved widespread recognition because of the importance it attaches to ecosystem-based management, precaution, and co-management, among other principles. All of these principles are relevant for MPAs in the transboundary sites contemplated here. Globally, CITES, and regionally, the Lusaka Agreement, also offer useful tools to combat the harvesting and illegal trade in marine endangered species in the region, e.g., marine turtles. Likewise, the Lusaka Agreement, together with CITES, could extend enforcement and protection to living marine and coastal species. INFOPÊCHE, particularly its SADC office (INFOSA), could be used to reduce conflict with industrial fishing interests.

An obvious weakness of international law is that a treaty is not binding on a State unless it becomes a Party to that instrument. This rule of classical international law continues to defer to national sovereignty, irrespective of the merits of a treaty or the urgency of the problems that the instrument tries to address. These three East African States are not Parties to all the relevant instruments. For example, Mozambique has not signed the London Convention, and Tanzania and Mozambique's distance from the Whaling Convention is noteworthy considering that this region is habitat for several whale species. Thus, there is a need for political commitment to pursuing regional outcomes that are consistent with international conservation prerogatives. Transboundary MPAs and transboundary networks of MPAs could incorporate global and regional principles, rules, and practices into bilateral or sub-regional agreements to help achieve stated marine conservation outcomes, as is the case with the Lubombo-Kosi Bay TFCRA between Mozambique and South Africa.

5. CONCLUSION

This article set out to examine the extent to which instruments of international environmental law and the law of the sea are of actual or potential assistance to current initiatives to establish a transboundary network of MPAs between Mozambique and Tanzania and Mozambique and South Africa. Although there is a trend towards transboundary conservation cooperation, its application to MPAs has barely begun. In East Africa, although global instruments are helpful, it is clear that regional and bilateral instruments are more conducive to the establishment of transboundary MPAs or transboundary networks of MPAs. Clearly and demonstrably, bilateral level cooperation is the most effective political and legal approach. However, bilateral initiatives for the creation of a transboundary network of MPAs should also be guided by the interests of conservation at the ecoregion level, as distinct from the achievement of solely national conservation objectives.

Global and regional instruments can play an important role in national and ecoregional conservation interests. Harmonisation of these two sets of interests through a multilateral agreement supporting a network of integrated MPAs (national and transboundary) would address conservation objectives at the EAME level. In the two transboundary sites, a model to follow for such an instrument could be the treaty between Mozambique, South Africa, and Zimbabwe establishing the Great Limpopo Transfrontier Park. Such an agreement would need to address a host of difficult issues, including desired conservation outcomes at the ecoregion level, the appropriate institutional framework, the type and degree of inclusive participation as a matter of good governance, and the applicable law for enforcement purposes in transboundary areas. A first step would be a bilateral approach, as in the present situation (supported by national declarations of MPAs and transfrontier task teams). Mozambique and South Africa, through the Lubombo-Kosi Bay TFCRA, together with the declaration of the Ponta do Ouro Partial Marine Reserve, created a transboundary MPA. This could serve as a starting point for the development of a trilateral agreement between Tanzania, Mozambique, and South Africa (among other diplomatic and management options) [21] to create a regional transboundary network of MPAs and transboundary MPAs that protect the EAME.

A regional network of MPAs would be an innovative mechanism for protecting the marine environment and achieving ecoregion targets in East Africa. Although

Mozambique, South Africa, and Tanzania are registering considerably more progress than many other States in meeting their 2012 CBD targets, a regional network of MPAs has the potential of not only enhancing the prospect of meeting those targets, but also of providing a leadership role in African marine conservation.

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GLOSSARY

Marine protected area: Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

Transboundary marine protected area: An area of land/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituting parts are especially dedicated to the protection and maintenance of biological biodiversity, and of natural and associated cultural resources, and managed co-operatively through legal and other effective means.

Marine protected areas network: A collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designated to meet objectives that a single reserve cannot achieve.

7. PROSPECTS FOR TRANSBOUNDARY MPAs

GRILO, C., Chircop, A. and Guerreiro, J. (*Submitted*). "Prospects for Transboundary Marine Protected Areas in East Africa". *Ocean Development & International Law*.

Abstract: Transboundary marine protected areas (MPAs) have been proposed in East Africa to tackle threats to marine biodiversity, meet international MPA targets, promote tourism and contribute to poverty reduction. This article examines what may drive, facilitate or constrain states to create a regime for transboundary MPAs. A regime between Mozambique and Tanzania is not yet formed and may be indefinitely delayed due to oil prospecting and exploration. There is a well developed regime between Mozambique and South Africa that resulted in the two adjoining MPAs being declared the first transboundary MPA in the continent.

Keywords: transboundary conservation; marine protected areas; regime theory; East Africa.

1. INTRODUCTION

The transboundary nature of many habitats and species, as well as of the threats posed to them, necessitates management approaches that are not confined to the areas under the jurisdiction of a single state. Transboundary protected areas constitute one tool at the disposal of neighboring states to jointly promote the conservation of their shared natural environment. In the case of states sharing marine habitats and species, transboundary marine protected areas (MPAs) can be particularly useful for their protection and for the promotion of cooperation.[1] However, their creation necessitates the establishment of a cooperative arrangement to facilitate collaboration in their management.

Regimes are "set[s] of implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations."[2] States that join a given regime expect it (i) to provide a framework for liability; (ii) to reduce transaction costs associated with reaching agreements among its members, facilitating future cooperation; and (iii) to improve the quality and quantity of information available on the behavior of states, reducing

uncertainty.[3] Thus, regimes can facilitate the coordination of multiple states' actions on issues of common interest, such as the creation and management of transboundary MPAs. Regimes are distinct from governance frameworks. Governance frameworks are "specific, purposive governance interventions that are developed and delivered by multiple actors at multiple scales in pursuit of a broad goal", while regimes "encompass the whole range of customs, norms and rules that shape a particular object."[4] Put more simply, governance is the way in which a regime is implemented. Governance is critical to the consideration of cooperation in the creation and management of transboundary MPAs, because the lack of participation from relevant stakeholders at appropriate scales can hinder cooperation in the creation of such a regime, and may affect the success of its implementation.

We investigated what drives, facilitates and constrains states in creating a regime for transboundary MPAs in East Africa. In this region, two transboundary MPAs have been proposed for the borders between Mozambique and Tanzania and between Mozambique and South Africa, to protect marine biodiversity, promote tourism and contribute to poverty reduction.[5] The domestic governance frameworks of these states for MPA-making have been examined,[6] and diplomatic and management options proposed as paths for coordinated action.[7] However, it remains to be seen whether Mozambique, South Africa and Tanzania are willing to move forward with the creation and management of transboundary MPAs.

In the following section, we present the theoretical framework that makes this paper one of few applications of regime theory to the study of transboundary conservation.[8] Its novelty lies not only in the geographical focus of the paper, but also in its prospective character. Regime theory will guide the discussion of the Mozambique-Tanzania case in section 3 and the Mozambique-South Africa case in section 4. In these two sections, we use information collected through interviews with key actors in the three states, and extracted from relevant plans, policies and reports to identify states' motivations to create transboundary MPAs, discuss issues of relevance for MPA-making in each region, and elaborate on the expectations regarding the ability of the proposed transboundary MPAs to address these specific issues. We finalize by presenting the lessons learned in these two cases, which we hope can assist the involved states in setting up tailor-made regimes.

2. THEORETICAL BACKGROUND

Regime theory attempts to explain how states claiming sovereignty but competing for power and influence can cooperate in an international arena that does not have a central government to make and enforce rules of behavior.[9] Regimes operate as "intervening variables standing between basic causal variables (most prominently, power and interests) and outcomes and behavior", thus facilitating coordination between actors in the international sphere in relation to a given issue-area.[10] In other words, regimes provide a framework of predictability for states to interact regarding particular issues. The elements of regimes mentioned above are defined as follows: "principles are beliefs of fact, causation, and rectitude; norms are standards of behavior defined in terms of rights and obligations; rules are specific prescriptions or proscriptions for action; decision-making procedures are prevailing practices for making and implementing collective choice".[11]

In negotiating regimes and cooperating in a regime, states embody different and often contradictory interests resulting from their particular domestic dynamics.[12] They can also be influenced by non-state actors, such as international non-governmental organizations (NGOs).[13] Regime theory has also been used to explain cooperation between states in environmental and natural resource issues, such as marine pollution in the Mediterranean,[14] the regulation of whaling and the conservation of Antarctica's environment.[15] While the existence of a regime does not ensure that participating states will cooperate, they do provide a useful framework to investigate how and why cooperation may occur.

Regime formation can be explained in terms of the power and capabilities of states regarding the issue-area at hand, their specific interests, their knowledge and perception of the issues at stake, and context.

Power resources include (i) enough control over a resource allowing a state to dominate collective decision-making affecting it; (ii) sufficient capacity to change the quality of the shared resource; (iii) enough trade control allowing environmental restrictions to seriously affect trading partners; and (iv) a reputation for diplomatic behavior and scientific knowledge.[16] Power and capability considerations are significant for the two case studies here described because they attest to the ability of the states involved to create and manage transboundary MPAs.

The existence of a regime can enable states to realize their common interests,[17] and hence promote cooperation in that regard. When considering their interests, states take into account both the benefits and costs of maintaining the *status quo* and of joining a regime. Consideration of the motivations of states in creating and managing a transboundary MPA can provide an indication of how committed they may be to overcome obstacles to cooperation.

The interests of a state regarding its membership in a given regime are defined not only by its capabilities but also by its knowledge, values and perception of the importance and consequences of the issues at stake, as well as the options available to solve them.[18] These aspects are significant to assess the potential for cooperation in the creation and management of transboundary MPAs. This is because they are an indication of how appropriate states perceive transboundary MPAs to be instruments or means to address the problems that motivated them to consider their creation.

In addition to power, interests and knowledge, there is a range of other factors that are merely circumstantial and unrelated to the issue at hand but that are able to determine if and when cooperation will occur and to shape resulting regimes.[19] These contextual factors may include shifts in values and ideas, new political trends, or simply specific events such as changes in political appointees. For example, transboundary marine conservation currently represents a paradigm shift, which has been motivated by the physical continuity of the marine environment, the global impact of human activities, and the recognition that borderless ecosystems require borderless protection.[20]

While regime formation results from interactions between power, interests, knowledge, and context, it is possible that all these factors are conducive to regime formation and yet none may be formed. This is because regime formation is often propelled by specific triggers, that is, specific circumstances that create in relevant actors an urgent need to cooperate through an enabling regime. Such circumstances can consist in the perception of likely benefits that may accrue from creating a regime. An eminent threat posed to resources, species or people would also impel actors to agree on a regime. In other situations, international pressure may be sufficiently encouraging for regimes to be formed or altered. This international pressure may result from states not complying with international conventional obligations. Of course, states may also decide independently to abide by the obligations they voluntarily committed to, only out a sense of moral commitment.

In the following sections, we examine how these factors interact and may affect cooperation in the creation and management of transboundary MPAs between Mozambique and Tanzania and between Mozambique and South Africa.

3. THE BORDER REGION BETWEEN MOZAMBIQUE AND TANZANIA

3.1 Status of existing proposals

Mozambique and Tanzania have in recent years engaged in bilateral discussions regarding the creation of a new MPA on the Mozambican side as the first step to establish a transboundary MPA between the two countries. The Palma National Reserve (PNR) was proposed by the Mozambican Ministry for Coordination of Environmental Affairs (MICOA) to partially fill the gap in marine protection that exists between the Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP) in Tanzania and the marine component of the Quirimbas National Park (QNP) in Mozambique.[21]

Bilateral discussions between the two countries have occurred under the umbrella of a Memorandum of Understanding (MoU) signed in 2007 between the regional governments of Ruvuma and Mtwara in southern Tanzania, and the provincial governments of Cabo Delgado and Niassa in northern Mozambique.[22] These initial conversations resulted in MICOA commissioning, on behalf of Mozambique and Tanzania, a proposal for a transboundary MPA to be proclaimed once PNR is created, in order to promote biodiversity conservation, tourism development and poverty reduction in the region.[23] This potential transboundary MPA would also meet the World Wildlife Fund's (WWF) goal of protecting the Mtwara-Quirimbas complex.[24]

The MoU determines the creation of, among others,[25] the Environment and Conservation Working Group (E&C WG) "to oversee tourism and conservation issues".[26] This working group was set up in Tanzania and met two times with the participation of a MBREMP representative. In these two meetings, a transboundary MPA was discussed. Mozambique had not assigned focal points to the E&C WG, and so Tanzanian participants were tasked with identifying their counterparts. A third meeting was held in January 2011 in Mozambique, where matters of common interest were discussed but did not involve the proposed transboundary MPA.[27]

3.2 Motivations for the proposals

Mozambique's motivation to create a new MPA, and eventually a transboundary MPA with Tanzania, is rooted in the recognition of overexploitation of marine resources in its northern coast driven by population growth and by Tanzanian migrant fishers.[28] At the 2003 World Parks Congress, Mozambique made public its commitment to create transboundary MPAs with both its neighbors as part of its efforts to meet international MPA targets.[29]

Tanzania's main motivations for the creation of the PNR are the weak law enforcement on the Mozambican side, and the uncontrolled cross-border movement of people. For Tanzania, the advantage of creating PNR is that state presence (i.e., law enforcement) would increase in that area. Currently, the Mozambican side of the border, a remote part of the country, is a "safe haven" for those wanting to engage in illegal activities such as extensive mangrove cutting in the Ruvuma River and surroundings. This is a natural resource-rich area that is adjacent to MBREMP but out of the reach of its officers.[30] Tanzania does not envision the proclamation of the transboundary area without Mozambique first creating PNR: "*it is like engagement: you don't get married before engagement*".[31]

Though these and other interests have propelled authorities of the two countries to meet, the dropping of the proposed transboundary MPA from their agendas signals that they will likely not be translated into any meaningful political action in the near future.

3.3 Reasons for lack of progress

Current lack of progress in the creation of a new MPA adjoining MBREMP as the first step to a transboundary MPA between Mozambique and Tanzania can be attributed to several factors.

First, there are differences in how the two states envision the preparation of a joint proposal for a transboundary MPA. Mozambique prefers to have technical meetings to compile relevant information, followed by political approval of the proposal, and then later submit it to the Ministry of Foreign Affairs to convey it to high-level meetings between the two countries.[32] Consequently, a proposal would reach national decision-makers already in an advanced stage. In contrast, Tanzania would like to expand the political scope of bilateral discussions to include ministries from both countries. In this way, a joint proposal could be elaborated in close connection with higher levels of decision-making.

Second, meetings promoted by the E&C WG under the MoU have involved distinct governmental levels. Tanzania's participants have included staff members of the Marine Parks and Reserves Unit,[33] while contacts with Mozambique have only involved provincial representatives. Naturally, decisions made in these meetings need to be sanctioned centrally in Mozambique before implementation can proceed.[34] Also, while MBREMP's representatives participated in those meetings, QNP staff members were not contacted.

Third, the lack of involvement of relevant national decision-makers at an initial stage, and the consequent need for approval by the central government in Mozambique may have influenced the fate of the PNR proposal. This proposal, commissioned by MICOA to the International Union for the Conservation of Nature's (IUCN) office in Mozambique, was submitted to a multi-ministerial group. The outcome of this collective evaluation remains unknown, and no further steps have been taken to create this MPA. This group of ministerial representatives did not include the Ministry of Energy, a rather surprising move as this region is rich in hydrocarbons and has the potential to significantly reduce Tanzania's and Mozambique's dependence on external sources of energy.[35] MBREMP has a natural gas field operating since 2006 within its boundaries that is used to produce electricity for the entire region. Hydrocarbons have also been found on the Mozambican side of the border, and though their commercial viability is yet to be determined, their development appears promising.[36] It is unlikely that an MPA would be created in this region by Mozambique before the prospects for oil and natural gas production are fully understood.

Forth, there are differences in the language skills[37] of the officials of the two countries that appear to hinder cross-border institutional communication.[38] Though this may be a minor issue,[39] it is important when contrasted with the generalized perception that transboundary conservation is facilitated in Africa by the porous nature of political borders delimited during colonial occupation. Indeed, it is a paradox that local communities sharing family ties, language, culture and religion, can easily communicate across the border, but decision-makers from both countries find it difficult to communicate across the same border in their respective official languages.

3.4 Existing capacity

Communication difficulties resulting from different language skills speak directly to the capabilities of each state. Mozambique and Tanzania are among the poorest countries in the world, though Tanzania is better positioned than Mozambique in terms of their Human Development Index.[40] Part of this developmental differential is attributed to the economic and social disruptions Mozambique experienced as a result of independence and civil wars. These troubled times in Mozambique's history were important in cementing its friendship with Tanzania: Mozambique's liberation movement was based in Dar es Salaam, and attacks against the Portuguese colonial regime were often launched from Tanzania. However, and though this friendship continues to be recognized at various political levels, it has also been accompanied to some extent by a condescending attitude of Tanzanian officials toward Mozambique. Nevertheless, most governmental officials and NGO staff members interviewed in Mozambique perceived Tanzanian governmental officials to be better organized, and also highlighted their better knowledge of the issues affecting their natural environment.[41]

An additional indicator of each state's ability to cooperate in transboundary MPA creation and management is how they both dealt with the challenges of MPA management in this transboundary region. In Mozambique, the Quirimbas National Park was created in 2002 with financial support from donors and has greatly benefited from the direct involvement of WWF-Mozambique. The involvement of this NGO has been crucial in such a remote area of the country. It is recognized that the park faces important challenges, such as its extent (7.500 km^2 of which 1.500 km^2 are marine), large human population (±130.000 people), and insufficient number of wardens for law enforcement. Specifically, the marine component of the QNP faces the problem of overexploitation of marine resources which is exacerbated by migrant fishers from Tanzania. Overexploitation has its roots in population growth and declining reliability of farming due to drought, while fishers' migration results from overexploited marine resources in Tanzania and probably also from the creation of the MBREMP. To protect biodiversity and enhance local fish stocks, several no-take areas were created inside the QNP. The QNP also partnered with fishing authorities to promote the organization of local fishers into fisheries co-management organizations.[42] This power-sharing approach to marine resource management inside QNP is not atypical or surprising, given QNP's clear efforts in regularly consulting local communities regarding numerous aspects of its management[43] and its inability to enforce regulations in such a large area.

In Tanzania, the Mnazi Bay-Ruvuma Estuary Marine Park was created in 2000 with the initial financial support of donors. Though IUCN played an important role in implementation, WWF-Tanzania is currently the only international NGO with a permanent office near the park,[44] from where it promotes community development activities inside the MPA. The park has a population of 30.000 people, and covers an area of 650 km^2 (one third of which is terrestrial). Though smaller than QNP, MBREMP also faces its own challenges, most visibly its high population density.[45] Many fishers still oppose MPA regulations quite strongly, particularly in the more resource-dependent villages. Population growth and prolonged drought have contributed to overfishing, and because local fish stocks are almost depleted, there has been an increase in highly profitable, but very damaging, dynamite fishing. Unlike in Mozambique, fisheries co-management institutions are only promoted outside MPAs in Tanzania. MPA staffs are committed to solve these challenges, but their capacity was recently reduced as top officers took leaves of absence to carry out their studies.[46]

3.5 Oil and natural gas exploration in MPAs

Hydrocarbon exploration is of critical importance to the future of MPA-making in this transboundary region. It is very unlikely that either country would forgo the tremendous impact on their national economies that an important discovery could have in order to create an MPA. Hence, the need to assess how each country stands on this issue.

The MBREMP is viewed in Tanzania as a good example of how hydrocarbon exploration is not incompatible with marine environmental protection through MPA creation. Natural gas exploration was subjected to an Environmental Impact Assessment and had to observe stricter rules because of its location. For this, and in the face of the ongoing hydrocarbon exploration in Mozambique, it is seen as an example that Mozambique could follow.[47] Because of the importance that hydrocarbons have for national development, WWF-Tanzania, a leading NGO in the country, has adopted a strategy of not opposing hydrocarbon exploration. Instead, it advocates adherence to international environmental standards by the oil industry operating in the country.[48]

Therefore, the interplay between marine environmental protection and oil exploration in Mozambique is crucial for the future of the proposed transboundary MPA. Hydrocarbon exploration is a national priority because of its potential to decrease the country's dependence on external sources of energy and, eventually, also to increase

exports. This issue is even more pressing given Mozambique's developing context. Thus, it is not surprising that hydrocarbon exploration appears to be a national priority that supersedes MPA creation. But what can be expected if commercially viable hydrocarbons are found in northern Mozambique? The infrastructure for hydrocarbons exploration, production and processing is inexistent in northern Mozambique, and the country would then be faced with two options if the identified oil reserves are commercially viable.[49] On the one hand, Mozambique's first oil refinery could be built, along with a pipeline from sea areas where commercially viable hydrocarbons are found. On the other hand, hydrocarbons could be transshipped for vessels to transport where there is a refinery. In either case, the creation of the PNR and, consequently, of the transboundary MPA, will likely depend on when the location of commercially exploitable reserves is confirmed and what type of hydrocarbons are there.

3.6 Expectations regarding tourism, fisheries, and poverty reduction in MPAs

As in the case of the existing MPAs in the region, the proposals for these new MPAs are based on general expectations regarding their ability to promote tourism, support fisheries and reduce poverty. This paper considers the realism of those expectations against a review of the performance of existing MPAs in these fields.

In the two countries, MPAs are relied on to foster tourism and to provide direct benefits through tourism operator fees. The current ministries under which MPA creation and management are placed reflect this expectation.

In Mozambique, MPAs are created through the Ministry of Tourism, which has the mandate to create and manage protected areas in the country. This institutional connection between protected areas and tourism was established in 2000 because "tourism was seen as one way of financing protected areas management."[50] Indeed, the establishment of the Quirimbas National Park rested on, among others, the premise that "underdevelopment represents an opportunity for the tourist industry."[51] QNP's Tourism Development Plan aims at intertwining tourism development with conservation and at producing "tangible benefits for local communities through tourism."[52] Tourism operators and visitors already contribute to the parks' budget through operator and entrance fees. However, it is unlikely that this makes up a significant part of the park's budget, which is still largely supported by donor funding.[53]

In Tanzania, the MPRU has been under the umbrella of the Ministry of Livestock Development and Fisheries since 2008. Before then, it was under the Ministry of Natural Resources and Tourism.[54] The MPRU clearly supports the view that "marine parks and reserves are a new tourism product",[55] and coral reefs in particular are an important tourism attraction.[56] Similar to the QNP, the establishment of the MBREMP was also premised on its ability to stimulate tourism and derive benefits from it.[57] However, these have been unfulfilled expectations. The only tourism operator inside this MPA was forced to shut down after a sudden increase in tourism operator fees determined nationally. Any further tourism activity in the MPA is unlikely to emerge, not only because of the fees but also because this is a location that can hardly compete[58] with the popularity of Zanzibar or Mafia Island.[59] Donor funding for MBREMP has ended and this MPA is currently funded by the Tanzanian government. The initial dependence of the MBREMP on international donors[60] is common to other marine conservation initiatives in Tanzania,[61] and reflects a national pattern in donor-driven nature conservation.[62]

There are widely held beliefs regarding the role of MPAs in promoting fisheries, and thus obtain support from fishers.[63] These have been based on the abundant evidence of increased catches inside and near MPA boundaries, particularly in coral reefs where the mobility of fish species is generally low.[64] Indeed, overfishing and the use of destructive fishing gear were the main motivations to create the marine component of the QNP[65] and the MBREMP.[66]

In QNP, several sanctuaries (i.e., no-take areas) were created in consultation with communities. These temporary closures are open to fishing a few days every year, and the large catches obtained have contributed to generate support from fishers. However, the creation of sanctuaries was often at odds with local communities' preferences.[67] Also, fishers often complained that sanctions for lack of compliance with sanctuaries were disproportionate.[68] Consequently, the relationship between fisheries authorities and park authorities was tense. This has eased since the QNP concluded a Memorandum of Understanding with fisheries authorities that detailed how the several institutions with a fisheries-related mandate inside QNP were to coordinate their activities and cooperate.[69] The most prominent of these activities is to support fishers in establishing Community Fisheries Councils. These fisheries co-management organizations, known locally as CCP[70] (or *Conselhos Comunitários de Pesca*), are starting to address the problems of migrant fishers, overfishing and the use of destructive fishing gear.

Destructive fishing practices in particular dynamite fishing in coral reefs, were the main motivation for the creation of the MBREMP.[71] This MPA has had a positive impact on coral reef condition, and there is anecdotal evidence of improved catches. However, dynamite fishing is resurging. Its comeback is explained by its high profitability.[72] In face of depletion of local fish stocks, it is a very attractive activity for dispossessed youth by which they can quickly improve their economic situations.[73] The resurgence of dynamite fishing is further compounded by the tense relationship between fishers and park authorities which has its roots in MPA implementation. A gear exchange program offered new fishing gears and motorized boats to fishers who owned gear banned by the new MPA regulations. The program did not reach all fishers, and it was perceived as unfair by fishers who did not own banned gear and were thus not eligible for new gear.[74] Currently, the park is assisting local communities, through other institutions, in improving school infra-structure and developing their community-based organizations,[75] as well as in accessing training for alternative income-generating activities (AIGAs).[76] However, its performance is not more than "satisfactory" in all evaluated management outcomes.[77]

Lastly, MPAs are often promoted and created in the two countries with assumptions regarding their ability to contribute to poverty reduction. The rationale for this lies in the potential for employment opportunities for locals in tourism, and with the expectations of improved fish catches resulting from increased marine protection. Clear linkages between tourism and poverty reduction are usually not easy to find, mostly because they often go unreported.[78] Yet, in Tanzania, tourism has been found to reduce poverty through, for example, the building of new infrastructure for improved access between tourism attractions, which allows more visitors and facilitates new local business opportunities.[79] In the MBREMP, tourism is almost inexistent, with the only scuba diving operator in the region rarely taking divers to the MPA.[80] In Mozambique, tourism development in the QNP has had some impact in terms of employment and trickle down effects in local economies during the construction phase.[81] Employment in ecotourism in particular generates some economic substitution (in relation to marine resource use) but how long this effect may last may depend on the availability of AIGAs to where household resources (labor, savings) can be directed.[82] Additionally, tourism operators pay park fees that, in part, are channeled to local communities to use for collective purposes. However, there are also negative consequences of tourism in the QNP: high-end tourism ventures in some of the islands have displaced fishers,[83] and the presence of

tourists has raised concerns among elders regarding changes in local culture.[84] In contrast to tourism, the role of improved artisanal fisheries in poverty reduction has not been adequately recognized in the policies of the two countries.[85] Yet, improved fisheries can assist with poverty reduction as long as AIGAs are available while fishing effort is reduced. In Tanzanian MPAs, households that participate in AIGAs are less likely to use destructive fishing gear.[86] This can be particularly significant for marine conservation as those using destructive fishing gear are generally poorer.[87] AIGAs can reduce human pressure on resources as long as they are adapted to local contexts,[88] and are an important step in bringing people out of socio-ecological poverty traps.[89] In the MBREMP, AIGAs are being promoted by local and international NGOs and not by the park itself, reflecting the current capacity difficulties in this MPA. Indeed, MBREMP officers' work currently consists of law enforcement, and the way this task has been carried out since the MPA was created has been described as "*it's like the carrot and the stick, but there's no carrot and the stick is a really big stick*".[90] However, it should be noted that within MPRU, MPA creation and management is perceived as biodiversity conservation, and hence "*working with communities inside MPAs is* [considered] *work for the NGOs*".[91] In the QNP, fisheries have been enhanced through small no-take areas, but better coordination is required to ensure local markets can absorb above-average catches during the few days these no-take areas are open to fishing every year.[92]

3.7 Are the proposed MPAs an adequate and desirable response?

In considering the creation of the proposed Palma National Reserve as a first step toward a transboundary MPA, Mozambique and Tanzania need to assess their options to pursue conservation in their shared marine environment. This transboundary region is threatened by overexploitation of marine resources, which is partly driven by migrant fishers. Overexploitation of fisheries resources necessitates fisheries management and conservation measures, such as temporary closures to enable stocks to recover,[93] provision of AIGAs, and better law enforcement.

These could be provided within the framework of an MPA or through existing fisheries management institutions. Creating an MPA would match Mozambique's goal of increasing marine protection and Tanzania's goal of increasing enforcement capacity on the Mozambican side of the border. However, the problems that the MBREMP and the QNP face, and the existence of fisheries management institutions, bring into question the

need to create a new layer of governance through a new MPA. Additionally, the creation of a new MPA may be opposed by fisheries officers who believe that MPAs are being pursued "*to meet goals that are not connected to the survival of the communities or to the resolution of their problems*". One of these officers suggests instead that "*MPAs are a means to resource conservation, not an end;* [and that] *there are other measures, such as temporary closures and closed seasons that can be considered temporary MPAs*".[94] Indeed, existing fisheries management institutions can be strengthened to deal adequately with existing threats, particularly through co-management.

If, despite these difficulties, Mozambique decides do establish the PNR and, with Tanzania, declare this MPA and the MBREMP to be a transboundary MPA, there are other considerations that both states need to take into account when firming a general political agreement to cement their increased political commitment.[95] First, the two states need to give careful consideration to community participation. Though communities were consulted on the creation of the PNR, management of this MPA would need substantial outreach effort to ensure cooperation from communities, to provide AIGAs that reduce the impacts of reductions in fishing areas, and to avoid the mistakes committed in other MPAs. An agreement between the two states on the transboundary MPA should include specific provisions for community participation. These provisions should specify the conditions under which community involvement in MPA-related decision-making should take place.[96] This point is particularly important not only in itself, but because the creation of the PNR would place almost the entire coast of Cabo Delgado province in Mozambique inside MPAs, and will likely be resisted by stakeholders such as fisheries institutions.[97]

Second, this agreement should specify whether it aims at promoting an integrated approach through the harmonization of management measures between the MBREMP and the PNR (preferred by MPRU officers and WWF-Mozambique), or if it is to have each country deal separately with their own people and natural resource share, and to facilitate communication between both sides of the border for law enforcement purposes.[98]

Third, Mozambique and Tanzania should assess their institutional, human resource and financial capacities to ensure the adequate management of the new MPA and of the ensuing transboundary MPA, including donor options and how initial capacities can be maintained after external support terminates.

4. THE BORDER REGION BETWEEN MOZAMBIQUE AND SOUTH AFRICA

4.1 Status of existing proposals

In 2000, Mozambique, South Africa and Swaziland signed the General Transfrontier Conservation and Resource Area Protocol[99] whereby the three countries agreed to establish five transboundary protected areas between them. One of these transboundary protected areas is the Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area,[100] between Mozambique and South Africa.[101] This transboundary protected area is formed by the new Ponta do Ouro Partial Marine Reserve (POPMR) in Mozambique and the iSimangaliso Wetland Park (IWP)[102] in South Africa. The two MPAs are contiguous although the maritime boundary between the two countries is not delimited to date.[103].

POPMR was created in 2009, during our fieldwork, by extending seawards the limits of the terrestrial Maputo Special Reserve up to 3 nautical miles, covering a total area of 678 km^2. This MPA was established and is currently managed by DNAC – the National Directorate for Conservation Areas under the Ministry of Tourism in Mozambique – with direct technical support from the Peace Parks Foundation (PPF), a non-profit organization that promotes transboundary conservation in Southern Africa.[104] POPMR's main goal is to "protect marine and coastal species and their habitats".[105] POPMR is contiguous with IWP's marine section.

IWP is formed by various terrestrial and marine protected areas, many of which of longstanding existence (decades in some cases) and totaling 3.585 km^2. These were consolidated into IWP upon its listing as South Africa's first World Heritage Site. Its main goal is "the protection, conservation and presentation of World Heritage values, with a strong emphasis on locally beneficial economic development."[106]

Soon after POPMR was established by law, the Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area was proclaimed the first – and until now the only – transboundary MPA in Africa.[107]

4.2 Motivations for the proposals

In 1998, Mozambique, South Africa and Swaziland officially launched the Lubombo[108] Spatial Development Initiative (SDI). SDIs are state programs targeting specific regions with "unrealized economic potential" that may be unlocked by facilitating private

investment and thus promote wealth generation and employment.[109] Lubombo SDI's implementation has consisted in removing barriers to make this region a worldwide tourism destination, and end "the paradox of poverty amidst natural plenty".[110] SDI's principal activities consist of actions to remove such barriers to regional economic development, including a malaria control program, asphalting the main road from Hluhluwe in South Africa to Maputo in Mozambique to facilitate cross-border access and the creation of transboundary protected areas to promote tourism.

For South Africa, the proclamation of the new transboundary MPA with Mozambique will contribute to stimulate the region's economy, as Mozambique is expected to finally improve road infrastructures near the new MPA. The IWP is South Africa's tourism anchor project for the Lubombo SDI. Its management is premised on the "development for conservation", or the idea that "economic empowerment and job creation, through appropriate tourism development, is necessary to achieve conservation goals."[111] Coral reefs play a particularly important role in this regard: they are in very good condition[112] and are targeted by an important scuba diving industry.[113] IWP's World Heritage Status contributes to the promotion of nature-based tourism as the vehicle for economic development. The area covered by the POPMR is not yet a World Heritage Site but has been in the tentative World Heritage list since August 2008.[114] For South Africa, the designation of IWP as part of a transboundary marine World Heritage Site would enhance the attractiveness of the park for tourists.

For Mozambique, the creation of the POPMR was a natural step in protecting the region's biodiversity by extending the limits of the Maputo Special Reserve. Importantly, the establishment of the POPMR was necessary to demonstrate that this region is actively managed and protected, a requirement to obtain World Heritage Site status.[115] The POPMR's management also has a strong focus on coral reefs because of the local burgeoning scuba diving industry. There are also expectations that the POPMR will assist in regulating tourism development in the region, as this is growing quickly and uncontrolled.

4.3 Existing capacity and achievements

The POPMR's short existence evokes the need to consider each country's MPA and overall management capacity. Though Mozambique and South Africa are neighboring countries, there are striking differences between the two regarding their developmental

ranking in the Human Development Index.[116] As mentioned before, Mozambique's recent history has significantly hampered its development. In contrast, South Africa, already an economically strong country before the end of apartheid, is viewed as one of the new emerging economies at the global level. After Mozambique's independence, South Africa's apartheid regime supported destabilization in the country. Bilateral relations were officially reestablished in 1994, with the advent of the new democratic regime in South Africa and the end of civil war in Mozambique. Despite their distinct histories, the IWP and the POPMR face relatively similar challenges.

In Mozambique, there are 12.000 people living in the terrestrial area bordering the POPMR.[117] Still in its initial years of existence, POPMR is benefiting from PPF's involvement. Like in other transboundary protected areas in southern Africa, PPF's role consists in providing the technical means to facilitate implementation of transboundary protected areas.[118] For example, POPMR's program manager is paid by PPF, and liaises with DNAC and with the staff of the adjacent Maputo Special Reserve.[119] The main challenges that the POPMR currently faces are related to tourism activities. There are several tourism resorts being built along the coast and away from the border with South Africa by requesting land concessions[120] from Mozambican authorities. These concessions often conflict with biodiversity conservation and reduce the area available for local communities to use for their subsistence. In particular, conflicts have emerged between local communities, on one side, and district authorities and tourism developers on the other side, with the former complaining of not being consulted nor compensated for the private use of their land. At some places along the coast, tourism development is also threatening the dunes that are cleared of vegetation to make room for infrastructures. This negative impact is further aggravated by tourists that drive quad bikes on the dunes and 4x4 vehicles on the beach. Most tourists visiting the region are aware that such activities are not allowed, but take advantage of the weak enforcement capacity of Mozambican authorities. The new POPMR is contributing to improve this situation, through enforcement of the management plan, increased visible presence in various points along the coast, and liaising with different local and district authorities.[121] POPMR's team is exercising a stricter control of beach activities, including enforcing a ban on beach driving inside the POPMR (similar to the nation-wide beach driving ban in force in South Africa since 2004), and on the non-fishing use of jet skis.[122] It is not clear the role that the POPMR has played, if any, in controlling tourism development in the dunes, nor is it

clear if it will be able to face the enormous challenges posed by a deep-water harbor proposed to be built in the most important section of this MPA.[123] The harbor will be located near the southern limit of POPMR's no-take area, and will be supplied with goods from Botswana and Zimbabwe through a new 1.100 km-long railroad that will cross the Maputo Special Reserve.[124] Though similar announcements have been made in the past,[125] the recent signing of a Memorandum of Understanding by the three countries suggests that this time construction may actually begin.

The IWP has a different setting from that of the POPMR's. Although there are only 2.000 inhabitants inside the IWP, over 600.000 people live adjacent to its boundaries.[126] Despite its World Heritage Status, IWP has not met one of the World Heritage Convention requirements: an approved Integrated Management Plan.[127] Since 2000, IWP's management has been based on "interim planning measures."[128] The absence of a management plan implies that there is no "prime document from which other plans flow, and [that takes] precedence if there is doubt or conflict."[129] In addition to the lack of a management plan, there appear to be overlapping mandates between the IWPA and Ezemvelo KwaZulu-Natal Wildlife (EKZNW), the provincial nature conservation services. Unlike other protected areas in KwaZulu-Natal, the IWP is managed by a public entity other than EKZNW, the iSimangaliso Wetland Park Authority (IWPA), which reports directly to the Minister and not to the provincial government.[130] Hence, the tense relationship between the IWPA and EKZNW is not surprising, nor is the fact that they have contrasting interpretations of their individual mandates inside the IWP. On the one hand, the IWPA argues that it "contracted EKZNW to undertake nature conservation", and therefore EKZNW are "service providers... but we look at them as partners."[131] On the other hand, EKZNW views its mandate and IWP's as non-hierarchical and complementary: EKZNW has an agreement at the central level with the Marine and Coastal Management (MCM) division of the Department of Environment to undertake on its behalf law enforcement, awareness and research activities within MPAs in KwaZulu-Natal; and it conceives IWPA's mandate as being confined to tourism and social aspects (e.g., solving land claims).[132] In addition to unclear mandates, EKZNW and the wider research community face difficulties in obtaining permission from the IWPA to conduct research inside the IWP. This requires enduring a lengthy bureaucratic process, which is further compounded by IWPA's narrow understanding of the research that is to be conducted inside the IWP.[133]

In addition to these protected area governance issues, the IWP faces two particular management challenges: unauthorized tourism developments, particularly close to the border with Mozambique; and disputes with local communities.[134] Unauthorized tourism facilities have been erected inside the park by clearing vegetation. The IWPA has accompanied this closely, and some illegal tourism operators have thus been evicted and forced to rehabilitate the degraded areas. However, IWPA's relationship with local communities is tense. Though several land claims have been resolved successfully, there are other indicators of the benefits IWP may provide to people living in its vicinity to compensate for restrictions to resource use. Indeed, solved land claims do not necessarily involve resettlement by previously excluded communities, and can instead provide for some form of power-sharing for conservation-oriented resource management.[135]

The day-to-day management of the two MPAs is coordinated through direct cross-border contacts between their staff, while overarching political decisions are made by the TFCA Commission established by Article 4 of the General Trans-Frontier Conservation and Resource Area Protocol.[136] The creation of the POPMR and the proclamation of the Ponta do Ouro-Kosi Bay transboundary MPA have not added much to what the IWP was already achieving on the South African side of the border. There have been some efforts to coordinate law enforcement with Mozambican authorities. However, there remain doubts, including among those working directly in transboundary conservation, regarding its benefits for local communities: "*I am not sure that transboundary protected areas benefit local communities*".[137]

4.5 Expectations regarding tourism and poverty reduction in transboundary conservation

The Ponta do Ouro-Kosi Bay transboundary MPA, like the IWP, has been created from the premise that nature as a tourism attraction can promote economic development that benefits poor communities. We briefly assess the extent to which this expectation is being realized.

The potential of biodiversity as a tourism attraction and driver of economic development presupposes the existence of basic infrastructure. Under the Lubombo SDI, paving the road from Hluhluwe in South Africa to Maputo in Mozambique was required to stimulate tourism investment. Though South Africa's section of this road was paved before the POPMR was established, Mozambique's section has not been paved yet and a

4x4 vehicle is needed to travel between the border near Ponta do Ouro and the country's capital. Though it could be argued that an undeveloped road favours biodiversity conservation by restraining human presence, it seems that Mozambique's delay has not been purposeful in this regard, but instead has resulted from lack of funding. This, however, has not stopped Mozambique's southern coastal area from expanding its tourism offer in the past 10 years. In South Africa, tourism development is growing and appears to be associated with improved accessibility.

Tourism development can benefit local communities under certain conditions. First, their skills should match those needed by the sector. In impoverished, undereducated communities, this can be particularly challenging, except perhaps during the construction phase. For example, most Mozambicans working in tourism development near the POPMR are not from the region. In the IWP, many locals do seasonal house work (i.e., cleaning, cooking, washing) for tourist families. Even if there are local inhabitants with the necessary skills, tourism is often not able to absorb all the available skilled labor force. This means that local expectations regarding job opportunities in tourism inside protected areas[138] may never be met. Second, tourism investments should preferably be owned by locals, as this will more easily contribute to local retention of wealth.[139] In the POPMR, almost all the tourism investments are owned by South African nationals. In the IWP, they are also owned by South Africans, many of them are not from the region, and a few have their business head offices elsewhere. Third, preference should be given to tourism investments that benefit communities. This is the Peace Park Foundation's approach to the POPMR.[140] Yet, there are doubts that benefits to local communities resulting from tourism development can offset the reduction in areas available for resource use near the POPM.[141] Even if these conditions are met, there are still problems with tourism-led economic growth. By promoting a single sector to drive economic development, strong dependence on that sector can be expected to occur, reduced income from which will be felt in the off-season.[142] Also, tourism development often leads to local inflation of prices for basic goods and services, making these less accessible to the underprivileged local inhabitants.[143]

4.6 Current bottlenecks to bilateral cooperation

Although each MPA is making progress in addressing the respective challenges, there remain specific bottlenecks to effective bilateral cooperation in the protection of marine biodiversity and tourism promotion.

First, and as recognized by an interviewee working directly in transboundary conservation, "*the political side of the game is easy; it is making it happen that is hard.*"[144] In particular, on-the-ground implementation is at times complicated by technical representatives of South Africa, "*the less cooperative partner.*"[145] Indeed, difficulties in cross-border operational communication have been attributed to South Africans wanting to solve problems on their own. Law enforcement coordination in particular can complicate cooperation because different regulations are applied on each side of the border. Indeed, in October 2009, two Mozambican fishing vessels were apprehended by South African authorities for allegedly fishing inside South Africa's side of the transboundary MPA.[146] After being pursued into Mozambican waters, the two vessels were found with endangered bottom fish species protected by South African law but apparently not by Mozambican law.[147] Though this disparity suggests that the catch was obtained in Mozambican rather than in South African waters, the crews of the two vessels were placed under arrest and eventually deported, causing some tension among MPA officers in the POPMR and the IWP.[148] As found elsewhere, the absence of a delimited maritime boundary between the two countries does not appear, *per se*, to deter cross-border cooperation for law enforcement.[149] Because no other reasons were found to explain the less collaborative stand of South African officers, it is concluded that the until recently-strained relations between the two countries still affect cross-border cooperation.[150]

Second, there are substantial differences between South Africa's and Mozambique's technical and financial capacities. Funding limitations appear to be the reason Mozambique has not yet asphalted the road that runs from the border to Maputo. It is not clear if South Africa is negatively affected by this; it is more likely however that Mozambique would benefit from improving the road connection between its capital and its largest trading partner. In terms of technical capacity for protected area management, South African staff has a larger experience because of the country's history in protected area creation and management. Indeed, and because of IWPA's experience with the World Heritage Convention, its staff assisted Mozambique in preparing a proposal for POPMR's area designation as a World Heritage Site.[151] In Mozambique, protected area staff were substantially reduced during the civil war, but the number of people and the level of their training is increasing fast.[152]

The assessment of these bottlenecks is preliminary. The Ponta do Ouro-Kosi Bay transboundary MPA is less than 2 years old and so is the POPMR. As management

experience accumulates, it is expected that cooperation between the POPMR and the IWP will be stronger and spearheaded by activities of common interest.

4.6 Overcoming bottlenecks to cooperation

Though cooperation between Mozambique and South Africa faces some bottlenecks that may complicate the management of this transboundary MPA, they are not critical. They will eventually and likely be overcome in two ways. First, "*it will take at least 10 years before* [the transboundary MPA] *is fully functional.*"[153] In other words, at least a decade is needed to strengthen institutional and personal relationships upon which a functional transboundary MPA relies. Second, differences in capacity on both sides cannot be expected to be overcome in the short term. Indeed, and though this difference is recognized on both sides of the border, it has not deterred the creation of the transboundary MPA nor its inclusion in the World Heritage Convention tentative list.

5. DISCUSSION

In the two previous sections, we explored factors that can facilitate or hamper the regime-building for transboundary MPAs between Mozambique and Tanzania and between Mozambique and South Africa.

Concerning power and capabilities, a visible difference regarding the creation and management of their MPAs was found between Mozambique and South Africa. In contrast, Mozambique and Tanzania do not appear to be substantially different in their ability to manage their MPAs. Hence, in our two cases, uneven capabilities are associated with cooperation in the creation and management of transboundary MPAs. In this sense, South Africa can be considered a "benign hegemon", that is, a state that does not act altruistically but exercises positive leadership.[154]

In terms of their interests, the three states show opposing inclinations. On the one hand, there are some that support cooperation in the creation and management of a transboundary MPA; on the other hand, there are others that inhibit cooperation in that same regard. This is clearly the case of the proposed transboundary MPA between Mozambique and Tanzania, where the potential existence of commercially exploitable oil and natural gas appear to be deterring any efforts by Tanzania to involve Mozambican officers of the central government, and have likely halted further appreciations of the proposal to create the Palma National Reserve. In the Mozambique and South Africa

case, where national interests in environmental tourism-led economic development are generally aligned, the transboundary MPA is already a reality.

Knowledge and perception of the role of MPAs in tourism development, fisheries management, and poverty reduction were found to shape each state's interests. Common to the three states is the understanding that protected areas reduce poverty, a perceived benefit that is undoubtedly in the interest of all, although it is not necessarily a valid one. Furthermore, they all share similar views regarding how tourism can be coupled with biodiversity conservation, though slightly nuanced in each case. In the Mozambique-Tanzania case, tourism is seen primarily as a source of revenue to financially support MPA management, while in the Mozambique-South Africa case tourism is promoted as a driver of economic development.

Mozambique's nuanced views of the role of tourism in MPA management can be attributed to contextual factors. Its coastal northern region near the border with Tanzania is one of the poorest and remotest in the country (2.500 km away from the country's capital). Promoting biodiversity conservation there through MPA creation is more costly than creating an MPA closer to the country's capital, as is the case of the POPMR. Hence, tourism is relied on to finance MPA management in this region, a position that is shared by Tanzania.

By considering the role of these factors in regime formation in an integrated manner, and by recalling the definition of regime initially presented, we now elaborate on whether a regime for transboundary-MPA making exists in each of the two study areas.

In the case of Mozambique and Tanzania, the two countries share the principle that their shared marine environment needs to be protected from negative impacts of human activities. They further believe in the norm that coordinated actions need to be taken to better protect their shared marine environment. However, Mozambique seems to believe that this principle is incompatible with the principle that economic development is needed to reduce poverty, which is expressed in the norm that the country needs to explore its potential as a hydrocarbon producer. Because principles and norms constitute the defining core of regimes,[155] we argue that a regime does not exist between Mozambique and Tanzania for cooperation to protect their shared marine environment, though the two countries share that principle.

In relation to the Mozambique and South Africa case, the two countries share the same belief as Mozambique and Tanzania, with the particularity that protection of the marine environment serves, essentially, to support tourism-driven economic development.

This is translated into the norm espoused by the two countries that they need to coordinate actions to better protect their shared marine environment. The essential ingredient for creating this regime is thus defined. The regime is made operational through the application of rules and the adoption of decision-making procedures. In other words, even if it had not been made operational through the creation of the transboundary MPA, it would still be possible to affirm that a regime exists between the two countries for transboundary marine conservation. The chief rule in this case is exactly that of the creation and active management of the transboundary MPA. Decision-making procedures were not identified, though they are most likely to be consensus-oriented.

6. CONCLUSIONS

This paper investigated what drives, facilitates and constrains Mozambique, South Africa and Tanzania in building bilateral regimes for the establishment and management of transboundary MPAs. In particular, we explored how each state's MPA management capabilities, interests in creating (or not) MPAs, the knowledge and perceptions that shape these interests, and context, can affect regime formation. We conclude that a regime between Mozambique and Tanzania for transboundary marine conservation has not yet emerged, whereas there is a well developed one between Mozambique and South Africa. The former's potential for cooperation may never be reached, while the latter's is already being enjoyed, though with some difficulties that will likely wear off with time. Simultaneously considering a range of factors that can affect cooperation allowed us to enrich our analysis and, hopefully, afford it greater predictability.[156] Although the two cases addressed in this article are restricted to East Africa, we believe that similar prospective analyses can assist decision-makers at various levels in different geographical locations to anticipate issues that have the potential to constrain effective transboundary marine cooperation.

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NOTES

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[10] Krasner, supra note 2, at 189.
[11] *Ibid*., at 186.
[12] Oran R. Young, "The Behavioral Effects of Environmental Regimes: Collective-Action Vs. Social-Practice Models," *International Environmental Agreements: Politics, Law and Economics* 1 (2001): 9–29.
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[21] MBREMP is contiguous with the border with Mozambique, while QNP is located almost 200 km to the south of the border with Tanzania. MICOA, supra note 5.
[22] Memorandum of Understanding between the Regional Administration and Local Government of Mtwara and Ruvuma on the Part of the United Republic of Tanzania and the Provincial Governments of Cabo Delgado and Niassa on the Part of the Republic of Mozambique, 2007 (hereafter MoU).
[23] Bandeira *et al.*, supra note 5.
[24] WWF-EAME, *Eastern African Marine Ecoregion – Towards the Establishment of Ecologically Representative Network of Marine Protected Areas in Kenya, Tanzania and Mozambique* (Dar es Salaam, Tanzania: World Wide Fund for Nature, 2005).
[25] The other three are the economic, security, and public administration and good governance working groups.
[26] MoU, supra note 22, at Article 1, 1).
[27] Interviewee #1, Tanzania.
[28] MICOA, supra note 5.
[29] Sue Wells, Neil Burgess, and Amani Ngusaru, "Towards the 2012 Marine Protected Area Targets in Eastern Africa," *Ocean & Coastal Management* 50 (2007): 67–83.
[30] For example, a Tanzanian national was caught cutting a large mangrove area within MBREMP and upon release went to the Mozambican side of the Ruvuma River where he cleared a much larger mangrove area without being noticed by Mozambican authorities (interviewee #2, Tanzania).
[31] Interviewee #3, Tanzania.
[32] Interviewee #4, Mozambique.
[33] MPRU is a semi-autonomous governing body under the Fisheries Division of the Ministry of Livestock Development and Fisheries, and is responsible for the creation and management of MPAs in Tanzania. Ministry of Natural Resources and Tourism, *Marine Parks and Reserves Unit: Strategic Plan 2006-2010* (Dar es Salaam, Tanzania: Marine Parks and Reserves Unit, 2006).
[34] Chircop *et al.*, supra note 6.
[35] The lack of inclusion of the Ministry of Energy in the multi-sectoral group discussing the PNR proposal can be interpreted an attempt to create the PNR without input from this ministry. This is because its participation would have certainly reduced the geographical scope of the proposal as this overlaps with oil prospecting areas. Though the proposal would have eventually to be approved by the cabinet (and it is not clear if it ever reached a cabinet meeting), its future would likely be determined by the interplay between the Ministry of Energy and the Ministry of Tourism, two strong economical sectors in the country. If the proposal reached the cabinet, it seems then that the Ministry of Energy prevailed.
[36] Mozambique's National Petroleum Institute (INP, *Instituto Nacional do Petróleo*, in Portuguese) announced that natural gas had been found about 35 km from land. INP press release, February 2010, available at www.inp.gov.mz/en/destaques_2/anadarko_gas_discovery_in_the_rovuma_basin_offshore_northern_mozambique (accessed 29 August 2010). Later, Anadarko found deep-water oil in the same concession area. However, the deposit is unlikely to have commercial viability. "Anadarko Reports First Deep-Water East Africa Oil Find in Mozambique Basin," Bloomberg, 17 August 2010, available at www.bloomberg.com/news/2010-08-17/anadarko-reports-first-deep-water-east-africa-oil-find-in-mozambique-basin.html (accessed 26 September 2010).
[37] Tanzanian officers speak English and kiSwahili, the two official languages in the country but do not speak Portuguese. Mozambican officers speak Portuguese but not kiSwahili or other regional languages of northern Mozambique, as many of them are originally from other parts of the country. Most of them are not fluent in English either.
[38] Interviewee #1, Tanzania.
[39] Jaidev Singh, "Study on the Development of Transboundary Natural Resource Management Areas in Southern Africa – Global Review: Lessons Learned," in *Biodiversity Support Programme* 45 (WWF, 1999).
[40] Human Development Index (2010): Tanzania ranked 148 and Mozambique 165 out of 169 countries. Information for Tanzania available at http://hdrstats.undp.org/en/countries/profiles/TZA.html (accessed 25 May 2011) and for Mozambique available at http://hdrstats.undp.org/en/countries/profiles/MOZ.html (accessed on 25 May 2011).
[41] Interviewees #5 and #6, Mozambique.

[42] Natural resource co-management committees have also been set up throughout the park. These co-management committees deal with terrestrial resources and receive 20% of fees generated by the Park.
[43] MITUR, *Annual Report – 2007 – Quirimbas National Park* (Pemba, Mozambique: Ministério do Turismo, 2008). MITUR, *Annual Report – 2008 – Quirimbas National Park* (Pemba, Mozambique: Ministério do Turismo, 2009).
[44] There are a few local environmental NGOs operating in MBREMP. None has national projection.
[45] MBREMP's population density is 138 inhabitants/km^2, and QNP's is 22 inhabitants/km^2.
[46] At the time of fieldwork, the park's warden-in-charge was away doing his PhD, and the community liaison officer had taken over his role before she also left to continue her studies. The law enforcement officer was then the acting warden-in-charge.
[47] As expressed in the following statements: "*they* [Mozambique] *can learn from us*" (interviewee #3, Tanzania); "*Mozambique could be learning from us regarding how the MPA has allowed exploration*" (interviewee #7, Tanzania).
[48] Amani Ngusaru and Edward Kimakwa, "Actions Needed to Make Current Offshore Oil and Gas Exploration and Production Less Environmentally Damaging in Eame Countries.," *Policy Series: Oil and Gas*, ed. Eastern African Marine Ecoregion Programme (Dar es Salaam, Tanzania: WWF-Tanzania, 2009), 8.
[49] Interviewee # 8, Mozambique.
[50] Paul F. J. Eagles, "Governance Models for Parks, Recreation, and Tourism," in *Transforming Parks and Protected Areas: Policy and Governance in a Changing World*, eds. Kevin S. Hanna, Douglas A. Clark and D. Scott Slocombe (New York and London: Routledge, 2008), 39-61. Rudy van der Elst, "Management of the Bazaruto Archipelago," in *A Natural History of the Bazaruto Archipelago, Mozambique*, eds. Bernardine Everett, Rudy P. van der Elst and Michael Schleyer (Durban, South Africa: South African Association for Marine Biological Research, 2008), 115-18 at 116.
[51] MITUR, *General Management Plan 2004–2008 – Quirimbas National Park* (Maputo, Mozambique: Ministry of Tourism, 2004), at 11.
[52] Richard Tapper, Tom Buncle, Fernando Correia, David Rissik and Stephanie Rohrbach, *Tourism Development Plan of the Quirimbas National Park* (Kingston upon Thames, UK: Leeds Metropolitan University, 2007), at 1.
[53] Interviewee #6, Mozambique.
[54] This ministry has the mandate to create and manage terrestrial protected areas. MPRU's move away from this ministry was probably not incidental: there is anecdotal evidence that MPRU, along with the Fisheries Division where it is integrated, moved from the Ministry of Natural Resources and Tourism to the Ministry of Livestock Development and Fisheries because the latter wanted a share of the tourism revenue that MPAs are expected to generate. Two facts substantiate this assertion. First, and though MPRU is part of the Fisheries Division of the Ministry, it does not report to its director. Instead, it reports directly to the Ministry's Permanent Secretary. Second, MPRU was recently converted into the Marine Parks and Reserves Authority, a denomination that grants it legal autonomy and the ability to raise its own funds.
[55] Ministry of Natural Resources and Tourism. supra note 33, at 18.
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[57] MPRU, *Mnazi Bay-Ruvuma Estuary Marine Park: General Management Plan*, (Dar es Salaam, Tanzania: Marine Parks and Reserves Unit, Ministry of Natural Resources and Tourism, 2005).
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[102] Formerly, Greater St. Lucia Wetland Park.
[103] However, there is a *de facto* boundary which is observed by the two countries. Mozambique does not issue commercial fishing licenses to the south of Ponta Dobela because of the absent maritime boundary (interviewee #14, Mozambique), and South Africa prohibits navigation close to the purported boundary (interviewee #16, Mozambique).
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[117] DNAC, supra note 105.
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[120] Land in Mozambique is owned by the state; it cannot be privately owned. However, individuals and companies may apply for a land concession for private (individual or collective) benefit over a certain period of time. Depending on the size of the land, a concession can be requested from provincial governors (less than 1000 hectares), Minister of Agriculture (less than 10.000 hectares) and the Council of Ministers (more than 10.000 hectares).
[121] Interviewees #17 and #18, Mozambique.
[122] DNAC, supra note 105.
[123] *Ibid.*
[124] Available at www.dredgingtoday.com/2011/05/10/mozambique-zimbabwe-and-botswana-sign-mou-to-develop-techobanine-deepwater-port/ (accessed 9 June 2011).
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[127] UNESCO, supra note 115.
[128] IWP, supra note 106, at 11.
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[132] Interviewee #20, South Africa.
[133] Understandably, all research conducted inside IWP needs to be registered with IWPA. However, social science research and research that is not directly useful to IWP's management have very low chances of being approved (interviewee #19, South Africa).
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[138] Anselmo César Gaspar *Local People's Perceptions of Marine Protected Areas: A Case Study of Ponta Do Ouro, Mozambique* (School of Environmental Sciences, University of KwaZulu-Natal, 2008).
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[144] Interviewee #21, South Africa.
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[146] Available at www.e-tools.co.za/newsbrief/2009/news1021.txt (accessed 7 June 2011).
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8. DIPLOMATIC AND MANAGEMENT OPTIONS

Guerreiro, J., Chircop, A., **GRILO, C.**, Viras, A., Ribeiro, R., and van der Elst, R. (2010) "Establishing a Transboundary Network of Marine Protected Areas: Diplomatic and Management Options for the East African Context", *Marine Policy* 34(5):896-910.

Abstract: International conservation efforts and cooperation are increasingly necessary, particularly at an ecoregion level, for the achievement of international targets for protecting biodiversity and degradation of ecosystems. Whereas more than 11 percent of land is protected, less than 1 percent of marine space is similarly protected. Transboundary networks of marine protected areas and transboundary marine protected areas (TBMPAs) are an essential form of cooperation for meeting these international targets. This paper explores the diplomatic and political options for regional and sub-regional cooperation between Tanzania, Mozambique, and South Africa, for the establishment of transboundary conservation mechanisms in the Eastern African Marine Ecoregion (EAME). Five options for the establishment and management of these mechanisms are presented, together with actions to be taken to facilitate cooperation. The paper deal with a proposed strategy for the implementation of transboundary conservation mechanisms, focusing on TBMPAs, between the three countries at a biogeographical/sub-regional level, supported by lessons learnt in other transboundary marine conservation experiences. The paper concludes that although political will may exist among States sharing borders to establish TBMPAs, the complexity of dealing with sub-regional realities is a difficult obstacle to overcome in a single step. The situation at each border must be taken into account in order that different multi-scale and multivariate solutions, supported by a common baseline will ultimately converge in a common trilateral framework. Finally, a two-step approach seems to be in course with the declaration (October 2009) of a TBMPA linking Ponta do Ouro in Mozambique to iSimangaliso Wetland Park in South Africa, following one of the options formerly presented.

Keywords: Marine protected areas, Transboundary networks, Political options, Eastern African marine ecoregion.

1. INTRODUCTION

Following the 1972 United Nations Conference on the Human Environment, it became widely accepted that protected areas (PAs) were a key mechanism to combat the loss of

biodiversity and degradation of ecosystems worldwide. Although several PAs were created and became well known prior to the 1972 Conference, it was only then that a global approach was consolidated in to the World Conservation Strategy [1]. The Strategy in turn lead to the adoption of the World Charter for Nature by the United Nations General Assembly in 1982 [2]. The process of strengthening the global conservation framework reached its peak with the adoption of the Convention on Biological Diversity (CBD) in 1992 [3]. The CBD sets the following specific and successive targets for PAs: "at least 10 percent of the world's ecological regions effectively conserved"; establishment of a representative protected area systems by 2010; and, in the case of marine protected areas (MPAs), the 10 percent target is to be accomplished by 2012 [4]. Furthermore, the CBD adopted the Jakarta Mandate (CBD Decision, 1995) [5] which is aimed at the conservation of marine and coastal biodiversity and includes a programme of action. This trend was reinforced at the World Summit on Sustainable Development (WSSD) [6] in 2002 by the call of the International Union for Conservation of Nature (IUCN) for a global representative system of MPAs [7]. Subsequently, the 5th World Parks Congress in 2003 recommended that 20–30 percent of each marine habitat be closed to exploitation activities.

Intuitively, these international commitments are promising; the reality is that whereas more than 11 percent of land was protected in some way by 2008, less than 1 percent of marine space was similarly protected [8,9]. This suggests that initiatives at both national and international levels are not sufficient to match expectations and that greater efforts at MPA-making are needed.

Marine conservation typically employs three major mechanisms: the creation of MPAs, regulations to protect habitats and endangered species, and fisheries regulation. Since these initiatives are mainly implemented at a national scale, they fail to address the goal of protection at the level of a biogeographic region. This weakness underlines the need to establish representative networks covering the full suite of biological diversity (habitats, species and genetic resources) in an ecoregion.

Frequently, the distribution of species, habitats and ecosystems do not match jurisdictional or political boundaries. Thus countries need to establish cooperative mechanisms to protect and maintain biodiversity [10]. International organizations recognize that, at a minimum, the road to a "global representative system" of PAs depends on international cooperation at the level of the ecoregion. As a form of international cooperation, transboundary conservation mechanisms such as transboundary

networks of MPAs and transboundary MPAs (TBMPAs)[1] are an essential tool to reach this goal.

According to Sandwith *et al.* [12], the establishment of TBMPAs potentially enhances transboundary cooperation between countries once the TBMPA is jointly managed by the countries involved. Benefits arising from the use of TBMPAs instead of single and separate MPAs include the promotion of international cooperation at different levels and *fora*, improved environmental protection across ecosystems, and the assurance of better and more efficient resolution of problems (frequently transboundary) such as marine pollution.

The concept of MPA networks is also appealing. Networks represent a large-scale approach to conservation planning, which can contribute to the above-mentioned targets being met at the global scale and enhanced resilience, which is urgently needed in the face of climate change. The establishment of MPA networks potentially assures the protection of species and ecosystems, maintenance of genetic connectivity of populations, protection of ecological processes fundamental to ecosystem functioning, establishment of social and economic networks among stakeholders, and cost sharing, among other benefits. In the literature, there is a recognized need for networks of protected areas to be created, particularly in the marine environment because species and ecosystems (and even coastal communities) are more interconnected than on land, due to, for instance, oceanic and tidal currents, biological processes, and human activities [13].

Following the "transboundary" concept, there can be additional gains if MPA networks are also transboundary, i.e., if a national network can be linked to a regional network. Enhanced protection of species and ecosystems that cannot be adequately protected by only one country, e.g., migratory species or shared ecosystems; improved management of transboundary MPAs; enhanced information sharing and exchange of technologies and experiences between countries (capacity improvement); and definition of common objectives for shared areas, among others, are potential benefits from such networks [13].

While the protected area in a transboundary MPA is jointly managed by the countries involved, in a transboundary network of MPAs the protected areas can be

[1] The first transboundary protected area was established in 1932. The Waterton-Glacier International Peace Park between the United States and Canada was preceded by the establishment of national parks on each side of the border some years earlier [11].

established nationally and each country involved in the network maintains responsibility for the management of the area under its jurisdiction. However, all the involved countries must share a common understanding of the conservation or sustainable use goals to be pursued in these protected areas.

Recently, Mozambique, South Africa, and Tanzania have begun to explore the possibility of the establishment of transboundary marine conservation mechanisms in their common border regions and in the Eastern African Marine Ecoregion (EAME). In this paper, transboundary marine conservation mechanisms may entail the establishment of one or more TBMPAs or a transboundary network of MPAs (which may also include one or more TBMPAs).

This paper explores the diplomatic and political options for regional and sub-regional cooperation between the three countries for the purpose of transboundary marine conservation.[2] This type of cooperation has the potential to assist the three countries in meeting their CBD marine conservation targets. The paper starts by setting out the geographical and ecological context of the sub-region and the countries concerned, including the state of transboundary marine conservation initiatives. The paper then sets out options for cooperation on transboundary marine conservation, depending on the scope and intensity of cooperation based at the starting point back in 2006. The paper further identifies actions that would need to be undertaken to strengthen the framework for MPA cooperation and a potential strategy leading to the establishment of transboundary conservation mechanisms in the sub-region. Finally, the paper ends by analysing one of the options effectively chosen by states in October 2009.

In this paper, a marine protected area is, as proposed by IUCN, "any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" [14]. The term transboundary marine protected area is used as proposed by Sandwith *et al.* [12] to mean: "[A]n area of land or sea that straddles one or more boundaries between States, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituting parts are especially dedicated to the

[2] This study was carried out under the EU Project ''Transboundary networks of marine protected areas for integrated conservation and sustainable development: biophysical, socio-economic and governance assessment in East Africa'' (TRANSMAP), EU Contract no. INCO-CT2004-510862.

protection and maintenance of biological biodiversity, and of natural and associated cultural resources, and managed co-operatively through legal and other effective means". According to the IUCN [10], a MPA network can be defined as a "collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designated to meet objectives that a single reserve cannot achieve". The terms "border" and "maritime boundary" are used in the following manner: border refers in a generic sense to border regions between two neighbouring States; boundary is used where a maritime boundary has been delimited between those neighbouring States. The term "transboundary" refers to an area covering both sides of a border, whether or not a maritime boundary has been delimited.

2. THE CONTEXT

2.1. The Eastern African Marine Ecoregion

The EAME extends from Somalia to South Africa across Kenya, Tanzania, and Mozambique for more than 4600 km, covering an area of about 540900 km^2, including the 200 nautical mile exclusive economic zone (EEZ). Twenty-two million people are estimated to depend on the goods and services of that coastal area [15]. The EAME has several biodiversity-rich areas, such as mangroves, coral reefs, seagrass beds, beaches, and coastal mudflats, some of which are considered to be in a near-pristine condition. It is considered one of the top marine ecoregions for biodiversity, supporting ca. 1000 different seaweed species, several hundred sponge species, over 200 coral species, more than 3000 species of mollusks (oysters, cockles, mussels and clams), over 300 species of crabs, at least 50 species of starfishes, over 100 species of sea cucumbers, and more than 1500 species of fish [16]. Key species are well known and include dugongs, turtles, whale, sharks, and dolphins, not to mention the coelacanth. All of these species are under heavy pressure from exploitation. Thus, they have become the focus of international attention and cooperation, such as initiatives led by the World Wildlife Fund (WWF) [17]. Due both to the migratory character of several endangered species and the interdependence of the several component ecosystems, EAME has become a priority area for transboundary marine conservation.

The current trend[3] in the region is to reinforce the networks of MPAs in order to meet the 2012 targets in Eastern Africa. Wells *et al.* [9] showed that Kenya, Mozambique, and Tanzania appear to be on the road to meet the CBD target, with Kenya having designated 8.7 percent of its continental shelf as a MPA, as have Tanzania and Mozambique at 7.7 and 4 percent, respectively. South Africa recently claimed that 15 percent of its coast is covered by MPAs as a result of the declaration of four new MPAs in 2004 [19].

At the World Parks Congress in 2003, Tanzania committed to expanding the marine area under its protection to 10 percent by 2010, and Mozambique declared its intention to implement cross-border reserves with Tanzania and South Africa. Obviously the contemporary challenge is to develop cooperative transboundary conservation mechanisms to reach the CBD's 2012 ecoregion protection goal and to achieve not only ecological representativeness, but also a transboundary network of MPAs that ensures connectivity and effective management. Transboundary conservation mechanisms will provide for a more effective management of shared resources and transboundary activities (e.g., fishing) between these countries.

Geographically located between Tanzania and South Africa, Mozambique shares with these States sensitive coastal ecosystems like mangroves, coral reefs, estuaries, wetlands, sandy and rocky beaches, and seagrass beds.[4]

The establishment of MPAs cannot hope to be successful without consideration of the site-specific issues in the two border regions considered in this paper such as geography, ecological concerns, socio-economic dynamics, and jurisdictional matters, which collectively define the conditions for MPA-making efforts. These matters need to be addressed as they are conditions that can be expected to affect the effectiveness of domestic as well as TBMPAs [20]. Further, the two border regions are so far apart that

[3] Early conservation experiences date back to the 1960s: Inhaca and the Portuguese Islands MPAs (Mozambique, 1965); Tsitsikamma National Park (South Africa, 1968); Watamu Marine National Park and Malindi-Watamu Marine National Reserve (Kenya, 1968); and Dar es Salaam Reserves (Tanzania, 1975). Francis *et al.* [18] reviewed the historical process of creating and managing MPAs in the area.

[4] The EU project TRANSMAP has created a GIS platform (Transmap GIS) that allowed the mapping of both border areas (Tanzania–Mozambique and Mozambique–South Africa). The platform includes mapping of habitats, coastal land and sea uses, physical data, bathymetry, and the maritime zones of the three countries. Mapping of habitats in both areas was based on the most recent satellite imagery with appropriate resolution and treated to facilitate discrimination of cover by image analysis. Data for baseline mapping was sourced from responsible partners and the GIS layers from the data providers and all other GIS data were accessioned on the Transmap Meta-database, which was created to include metadata descriptions of datasets.

they have distinct ecological, socio-economic, and political features. Therefore, a contextualized approach is required.

2.2. The Tanzania–Mozambique border area

The terrestrial border between Tanzania and Mozambique is defined by the Ruvuma River (see Fig. 1a). The two States have also delimited the maritime boundary, including the territorial sea and EEZ [21]. Essentially, the border's coastal geography has an archipelagic configuration. Biodiversity in the area is extremely high, and several charismatic species have been recorded. These include sea turtles (*Caretta caretta* (EN),[5] *Dermochelys coriacea* (CR), *Chelonia mydas* (EN), *Eretmochelys imbricata* (CR) and *Lepidochelys olivacea* (VU)), humpback whales (*Megaptera novaeangliae* (LC)), minke whales (*Balaenoptera acutorostrata* (LC)), and various dolphins species (*Tursiops aduncus* (DD), *Sousa plumbea*,[6] *Stenella longirostris* (DD), and *Stenella attenuata* (LC)) [23–28]. Although the region presents suitable habitat conditions to dugongs and coelacanth, their status in the region has not been confirmed. As for corals, although an accurate inventory is lacking, a study coordinated by the Mozambican Ministry for Environmental Coordination (MICOA) in 2006 [29] recorded 125 species of hard corals (Scleractina) in the area.

Local communities on both sides of the border are poor and depend mainly on agriculture and artisanal fishing. Fishing mainly occurs in coastal and inshore waters using several types of gears. There is also intense cross-border trading. Many families have cross-border ethnic and kinship ties (e.g., the Makonde) and share their languages, traditions, and lifestyle.

On the Tanzanian side of the border, extending along the 125 km coastline, the Mtwara region has 1.128.523 inhabitants (according to the 2002 census results) [30] with the two coastal districts (Mtwara Urban and Mtwara Rural) accounting for 26 percent of the region's total population. The Mtwara region is one of the poorest in the country and has some of the least developed infrastructure in Tanzania. Agriculture accounts for 87 percent of the economy, while artisanal fishing accounts for 5 and 3 percent of economic

[5] According to 2009 IUCN Red List of Threatened Species. Version 2009.1 [22]: EN—endangered; CR—critically endangered; VU—vulnerable; LC—least concern; DD—data deficient; and NT—near threatened.
[6] Not included on the IUCN Red List of Threatened Species.

activity in Mtwara Rural and Mtwara Urban, respectively [31].[7] In recent years, the Tanzanian government has launched a series of initiatives to alleviate poverty, namely the Poverty Reduction Strategy Paper [32] and the Development Vision 2025 [33]. These initiatives have had a direct impact on the Mtwara Region where several projects are being developed. In particular, three projects should be highlighted:

(i) The Mtwara Development Corridor: A spatial development initiative aimed at creating an economic growth zone consisting of transborder trade and investment, linking Malawi, Mozambique, Tanzania, and Zambia. This initiative also includes the building (and rebuilding) of infrastructure, particularly roads (both in Tanzania and Mozambique), as the existing ones are impassable during the rainy season or do not exist at all.

(ii) Tourism is a main vector for development. The 125 km coastline has very attractive sandy beaches and several resorts are being planned.

(iii) Marine compressed natural gas (CNG) exploitation[8] is one of the most significant industrial developments, with the Mnazi Bay exploration and production concession covering a 756 km^2 area in southeastern Tanzania in the Mnazi Bay-Ruvuma Estuary Marine Park (MBREMP). Illegal fishing, coral mining, large-scale mangrove cutting, an increasing number of marine resource users and consequent overharvesting have added to the panoply of threats facing this coastal area.

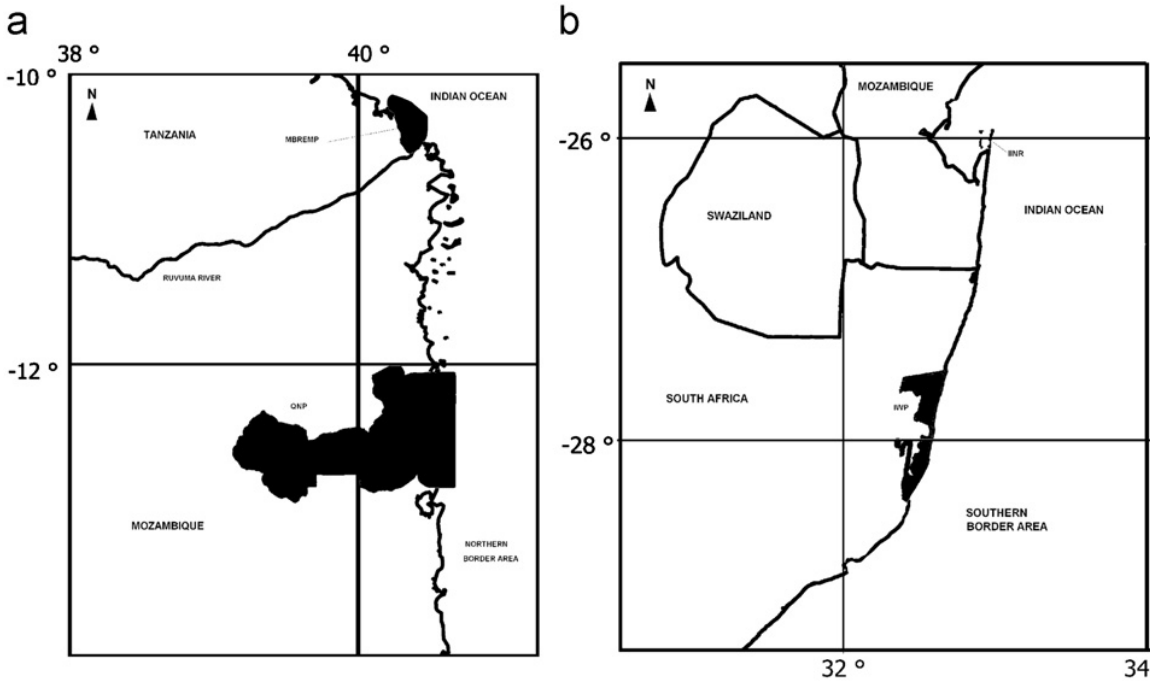
In 2000, the Tanzanian government responded to increasing environmental threats in this area by creating the MBREMP as a multi-purpose MPA. Located across from the border with Mozambique, the park covers a total land and sea area of 650 km^2 (of which 200 km^2 is marine), with 30000 inhabitants spread over 11 villages. The centerpiece of the current management strategy is a general management plan that was approved in 2005 [34] and is based on a "multiple use" philosophy. The Mtwara Development Corridor also enhances and promotes transboundary collaboration in natural resource management.[9]

[7] Nevertheless, as most of fishing is for local and self-consumption, these percentages might be underestimated in official statistics.

[8] This project was submitted to an environmental impact assessment (EIA) and mitigation measures are being implemented in coordination with the Mnazi Bay-Ruvuma Estuary Marine Park and Tanzanian Marine Parks and Reserves Unit.

[9] The Tanzanian government is also promoting management of shared resources, notably through its negotiations for the management of resources in Lake Nyasa, Lake Tanganyika, and Lake Victoria.

Figure 1 – (a) Border area between Tanzania and Mozambique (Source: adapted from Transmap Internet MapServer, http://internal.bio3.pt/transmap/default.asp, as of 21 April 2009). Description: (a) shows the northern border area with the terrestrial boundary between the two countries defined by the Ruvuma River. Existing MPAs are also shown, namely the MBREMP in Tanzania, located immediately across from the border with Mozambique, and the QNP in Mozambique, which is about 175 km distant from the border. Legend: MBREMP—Mnazi Bay-Ruvuma Estuary Marine Park, QNP—Quirimbas National Park. (b) Shows the Border area between Mozambique and South Africa (Source: adapted from Transmap Internet MapServer http://internal.bio3.pt/transmap/default.asp, as of 21 April 2009). Description: (b) shows the southern border area between Mozambique and South Africa. Existing MPAs are also shown, namely the IINR in Mozambique and the IWP in South Africa. Legend: IINR—Inhaca Island Natural Reserve, IWP—iSimangaliso Wetland Park (formerly Greater St. Lucia Wetland Park, GSLWP).



The Province of Cabo Delgado on the Mozambique side of the border has an extensive coastline (380 km) and includes the Quirimbas Archipelago, which is comprised of 28 islands. Its population size is similar to Mtwara (1.287.815 inhabitants, according to the 1997 National Census). Eighty-three percent of the population lives in rural areas. Like Mtwara in Tanzania, Cabo Delgado is one of the poorest provinces of Mozambique. Agriculture, fisheries, and forestry employ 92 percent of population. With 26.386 people involved in fishing activities, this is one of the key commercial and trading sectors [35]. Logging is both a dynamic activity and a major threat to the coastal environment as there is evidence of illegal logging and timber exports as a consequence of increasing economic pressures and weak law enforcement [36]. The Cabo Delgado Province Strategic Development Plan addresses the poverty issue and identifies the three key sectors for enhanced production of goods and services: (i) oil and gas development, (ii) tourism and (iii) artisanal fisheries.

The nearest coastal protected area to Mozambique's border is the Quirimbas National Park (QNP), which is 175 km from the border with Tanzania. The QNP was created in

2002 with a total area of 7506 km^2, of which 1522 km^2 are marine. The park encompasses 6 districts, 40 villages and has a population approximately 95.000 [37]. The park's management plan contains provisions for local communities' participation. The Mozambican government plans to create a protected area adjacent to MBREMP that covers both land and marine areas on their side of the border. The future Ruvuma-Palma National Reserve (RPNR) will constitute a decisive step in the development of transboundary conservation mechanisms and is evidence of the common political commitment to conservation between Tanzania and Mozambique. The Global Environment Facility (GEF) and the World Bank (WB) are funding two major projects in the MBREMP (Tanzania) and QNP (Mozambique).[10] Further, the establishment of TBMPAs between Tanzania and Mozambique is one of the priority activities of the Tanzania Marine and Coastal Environmental Management Project (MACEMP),[11] supported by the World Bank [40].

2.3. The Mozambique–South Africa border area

Mozambique and South Africa have not yet delimited their adjacent territorial sea and EEZ boundaries. The area considered in this study (see Fig. 1b) stretches from Maputo Bay (including Inhaca Island) to Ponta do Ouro and into South Africa down to the southern limit of the iSimangaliso Wetland Park (IWP,[12] formerly Greater St. Lucia Wetland Park (GSLWP)). The IWP includes a marine reserve component that is 5 km wide and extends for 155 km along the South African coast. Mozambique's coastal areas are mainly dominated by sandy beaches. These ecosystems, together with coral reefs, link Ponta do Ouro and Kosi Bay. These coral reefs are considered to be the most southern in the world.

Crossing the border area, 32 marine mammal species have been recorded at IWP that are both internationally threatened and listed in CITES appendices. Populations of bottlenose *Tursiops truncatus* (LC) and *T. aduncus* (DD), humpback *S. plumbea* and *S. chinensis* (NT), and spinner *S. longirostris* (DD) dolphins live in the waters of the park.

[10] The development of the MBREMP is being financed, since 2002, by GEF and the United Nations Development Programme (UNDP). Other institutions, such as IUCN and the Fonds Français pour l'Environnement Mondial (FFEM) are also supporters. The project's target is the protection and sustainable use of the marine biodiversity and resources of the MPA [38]. Biodiversity conservation and training activities in the QNP are funded by FFEM and the Agence Française de Développement (AFD) [39].
[11] The MBREMP and QNP management plans resulted from this process.
[12] The IWP resulted from the aggregation of 13 formerly protected areas and has been a World Heritage Site since 1999 [41].

Winter migrations of the humpback whale, *M. novaeangliae* (LC), and the southern right whale, *Eubalaena australis* (LC) have also been recorded [42]. Leatherback turtles, *D. coriacea* (CR), have an estimated population of 2500, of which 750 are female. Non-breeding green turtles, *C. mydas* (EN), are also resident, while hawksbill, *E. imbricata* (CR), and olive ridley, *L. olivacea* (VU), turtles visit the coast. Most of these species move across the border and up to Maputo Bay. Coral species (129) are particularly important for their conservation and scientific value. Regarding ichthyofauna,[13] nearly 85 percent of the reef fish species endemic to the West Indian Ocean are present in this area. Notably, the coelacanth *Latimeria chalumnae* (CR) is found here as the area has ideal habitat for this species in its canyons [43]. The ragged-tooth shark *Odontaspis ferox* (DD) and the whale shark *Rhincodon typus* (VU) have also been recorded here.

The movement of people in this area is mainly related to tourism, principally from South Africa to southern Mozambique and from Maputo to Ponta do Ouro. The high concentration of people resulting from tourism has a negative impact on the sand dunes and beaches. Sport fishing, often illegal, together with scuba diving,[14] constitutes a major threat to coral reef conservation in the area. Over the next few years both the South African and Mozambican governments foresee strong development in tourism in this area. They hope to develop the "Lubombo Tourism Route," as proposed under the Lubombo Spatial Development Initiative, in to one of the most desirable international destinations in the region. Their intention is to double the number of bed nights to four million by 2010 [45, 46]. At the same time, the Government of Mozambique has expanded the long existing Bazaruto National Park, which is now one of the largest MPAs in the region.[15] Traditional activities in the MPA are linked to artisanal fisheries. The National Small Scale Fisheries Institute (IDPPE) [47] estimates 2171 fishers using boats and 3007 collectors of marine invertebrates' resources operate in Maputo province, particularly in Maputo Bay.

On the other side of the border, in KwaZulu-Natal (KZN), 19 communities have been identified as subsistence (or small-scale commercial) fishing communities and 43

[13] Sawfish are a species that is considered critically endangered [22], and recent studies treat this species as extinct in South African waters. Thus, there is an urgent need to protect the population of southern Mozambique and to put a stock recovery plan in place.
[14] Pereira [44] estimates that there are approximately 7000 dives per year along this stretch of Mozambican coast.
[15] Studies, including TRANSMAP, are currently under way to identify other areas of potential interest for biodiversity conservation and to facilitate the establishment of a transboundary network of MPAs in this part of the EAME region.

Local Subsistence Co- Management Communities have been established [48–50]. There are many traditional and historic ties between families in northern South Africa and southern Mozambique, particularly those of Tembe/Thonga tribal heritage, which have encouraged the development of cross-border trade in fish, meat, and other goods [51]. According to Lemm and Atwood [52], there is also cross-border fisheries poaching from Mozambique, both from South African recreational vessels launched at Ponta do Ouro and by Mozambican semi-industrial fishing vessels.

In the border region, both governments have initiated conservation measures. In 2000, Mozambique signed a protocol with South Africa establishing the Lubombo Ponta do Ouro–Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area [53]. The protocol falls under the General Trans-Frontier Conservation and Resource Area Protocol [54] between Mozambique, South Africa and the Kingdom of Swaziland. Article 2 of the General TransFrontier Conservation and Resource Area Protocol sets out the goals and mechanisms for the creation of a transboundary PA (referred to as transfrontier protected area, TFCA). It draws upon the terms of several international agreements to which the three States are Parties, in particular the CBD. The Protocol defines the TFCA as “a specific geographical area divided by one or more political borders, which is identified by two or more of the parties to be the subject of TFCA management” and calls for “the development of joint strategies for trans frontier ecological planning and resources management”. The Protocol established a TFCA Commission with powers and means “for the successful achievement of TFCA objectives”.

3. EXPLORING THE RANGE OF DIPLOMATIC AND MANAGEMENT OPTIONS FOR TRANSBOUNDARY MARINE CONSERVATION IN EAST AFRICA

3.1. Precursors

Transboundary environmental conservation cooperation is a growing trend internationally. A global survey of such cooperation indicates the existence of 188 transboundary cooperative arrangements, involving 818 PAs (both terrestrial and marine) in 112 States [11]. To broaden this assessment and to identify as much information and as many experiences as possible, several examples of transboundary cooperation for nature conservation were analysed. These examples were not restricted to formal MPAs or to

tropical regions, but also included examples of international cooperation and temperate regions which might contribute to further analysis of the options presented in this case study. A short resume of the features of these examples is presented in Tables 1 and 2.

Table 1 - Examples of international cooperation for nature conservation surveyed in this case study.

Name	Establishment (agreements signed or established)	Total area (km^2)	Area per country (km^2)	Motivation	Process initiation	Implementing and management instruments
Great Limpopo Transfrontier Park	2002	34.778,84	LNP[a] 10.812,11 KNP[b] 19.031,22 GNP[c] 4935,51	Conservation of transboundary ecosystems	Direct tri-national negotiations and arrangements with international support	·International Treaty ·Joint Management Plan ·Strategic Integrated Management Plan for the GLTP[d]
Mesoamerican Barrier Reef System	1997	-	-	Protect the largest coral reef system in the Western Hemisphere from multiple threats	Joint declaration (the Tulum Declaration) that joins four countries in conserving the MBRS[e]	·Tulum Declaration ·Sustainable Development Policy for Fisheries, Tourism and Marine Protected Areas in the MBRS ·Chetumal Declaration (fisheries) ·Agreement on Common enforcement in the MBRS Geographical Area ·Rennovation Agreement
North America Marine Protected Areas Network	1999	-	-	Facilitate strategic design and establishment of a system of MPAs[f] throughout North America	Tri-national workshop	· (North American Agreement on Environmental Cooperation, 1993)
Turtle Islands Heritage Protected Area	1996	2447,31	My[g] 17,64 Ph[h] 2429,67	Protection of Marine Turtles	Joint work groups	·Memorandum of Agreement
Wadden Sea	1982	9191,04	Dn[i] 2465,14 Ge[j] 4038,67 Nt[k] 2687,23	Protection of an important tidal wetland with a great incidence of human uses	Cooperation in Trilateral Conferences since 1978	·Joint Declaration on the Protection of the Wadden Sea ·Trilateral Wadden Sea Plan

Description: This table summarises the characteristics of the examples of transboundary cooperation for nature conservation analysed in this paper. The description includes geographical aspects, such as the total area set aside for nature conservation by country, as well as details on the establishment, implementation and management of these areas. [a]Limpopo National Park. [b]Kruger National Park. [c]Gonarezhou National Park. [d]Great Limpopo Transfrontier Park. [e]Mesoamerican Barrier Reef System. [f]Marine Protected Areas. [g]Malaysia. [h]Philippines. [i]Denmark. [j]Germany. [k]Netherlands.

Table 2 - Relevant institutions established under the GLTP, MBRS, NAMPAN, TIHPA and Wadden Sea.

Name	Type of conservation mechanism	Administration	Management/ implementation	Technical	Other institutions
Great Limpopo Transfrontier Park	Transboundary Terrestrial Protected Area	Tri-national Ministerial Committee	·Joint Management Board (Equal representatives from the three countries) ·GLTP Management	International technical committee (main State conservation agencies of the three countries)	·The three governments ·Donor institutions (Financial support)
Mesoamerican Barrier Reef System	Transboundary Network of Marine Protected Areas	Governments of the four countries	Governments of the four countries through: ·SICA[a] ·CCAD[b] ·Project Coordination Unit ·BEMAMCCOR[c] ·TRIGOH[d]	n. a.	·GEF ·World Bank (Financial support)
North America Marine Protected Areas Network	Transboundary Network of Marine Protected Areas	·CEC[e] ·CEC's Council (Cabinet-level environment officials from the three countries or their designates	·CEC ·CEC's Council ·Joint Public Advisory (group of five citizens from each country) ·Secretariat (environmental experts from the three countries)	n. a.	n. a.
Turtle Islands Heritage Protected Area	Transboundary Marine Protected Area	·Sabah Parks of Malaysia ·Department of Environmental and Natural Resources of Philippines	·Project Management Teams ·Joint management ·ASEAN[f] Marine Turtle Specialist Group	·University Malaysia Sarawak ·Institute of Biodiversity and Environmental Conservation of Malaysia	·Institute of Biodiversity and Environmental Conservation of Malaysia and Philippines (Literature survey carried out by Malaysia)
Wadden Sea	Transboundary Network of Marine Protected Areas	·Trilateral Governmental Conference ·Senior Officials Trilateral Working Group	·Trilateral Monitoring and Assessment Group ·Trilateral Data-handling Group ·Monitoring Expert Groups · Trilateral Seal Expert Group[g]	n. a.	n. a.

Description: The table shows the most relevant institutions involved in the administration and management/implementation of the examples of international cooperation for nature conservation analysed in this paper. Technical and other institutions (namely funders) are also identified, as applicable. [a]System for Central American Integration. [b]Central American Commissionon Environment and Development. [c]Belize-Mexico Alliance for the Management of Common Coastal Resources. [d]Tri-National Alliance for the Gulf of Honduras. [e]Commission for Environmental Cooperation. [f]ASEAN—Association of South East Asian Nations. [g]Responsible for the implementation of the Seal Management Plan. The Seal Management Plan encompasses a trilateral monitoring of the populations of harbor seal (*Phoca vitulina*) that occur in the Wadden Sea. In the past years a virus emerged, the phocinedistempervirus, which has affected these populations. Therefore, the management plan aims, among other things, to eradicate or low the incidence of the epidemic virus.

In contrast with terrestrial experiences, there are relatively few examples of TBMPAs. The Turtles Islands Heritage Protected Area (TIHPA) in the Sulu Sea between Malaysia and the Philippines was possibly the first TBMPA. It was established in 1996 to protect the nesting grounds of sea turtles. It is comprised of nine islands, of which six are in the Philippines and three are in Malaysia. TIHPA represents the first effort to take

conservation across international boundaries in an entirely marine context and represents a formal TBMPA that is administrated and managed jointly by two States. TIHPA is also notable for being created despite the conflict over the delimitation of a maritime border between Malaysia and Philippines.

The Wadden Sea[16] and the Mesoamerican Barrier Reef System (MBRS) Project are examples of areas where strong cooperation exists between the States involved, and where separate protected areas in the marine environment already exist. The Wadden Sea is jointly protected through political agreements involving Denmark, Germany and the Netherlands. It consists of an extensive area of nature reserves and natural parks,[17] together with a major part of the particularly sensitive sea area (PSSA) established in the region by the International Maritime Organization (IMO) in 2001. The complexity of the ecological interdependencies and uses of the Wadden Sea area showed that it was not enough to protect only those areas with the highest ecological value. Therefore, the protected areas already referenced have been integrated into a legally binding conservation area (representing almost two-thirds of the Wadden Sea).[18] A larger area, the Wadden Sea Cooperation and Management Area, was established to enable the three countries to address all issues pertaining the Wadden Sea. Cooperation started in 1978, and trilateral governmental conferences have taken place every 3 or 4 years to set out cooperative trilateral initiatives in the Wadden Sea.

The Project for the Conservation and Sustainable Use of the MBRS is specifically devoted to transboundary networks of MPAs, and involves Mexico, Belize, Guatemala, and Honduras. The main motivation for protecting the region is the existence of the largest coral reef system in the Western Hemisphere (second longest in the world), which faces multiple threats from overfishing, industrial shipping, agriculture, uncontrolled mass tourism, coastal and watershed development with improper urban sewage, garbage disposal, and climate change. There are 15 priority MPAs within the MBRS transboundary zones. In fact, the MBRS region includes over 60 gazetted MPAs,

[16] The Wadden Sea is an important tidal wetland, extending along the North Sea coast of Denmark, Germany and Netherlands. It is surrounded by densely populated and industrialized areas that support human activities such as gas and oil exploitation, tourism and fisheries.

[17] The Wadden Sea nature reserves and national parks could be considered as MPAs since the areas covered are largely marine areas. However, none of the littoral countries include MPA designation in their conservation laws.

[18] This trilateral conservation area consists of the National Planning Decree area in the Netherlands, three national parks in Germany, and the Wildlife and Nature Reserve in Denmark [55].

although many of these only exist on paper and lack an effective management regime [11]. Fifteen representative MPAs of importance to multinational stakeholders were chosen to be the focus of MBRS in or near transboundary sites.

The North America Marine Protected Areas Network (NAM- PAN) is a trinational project—United States, Canada and Mexico—involving a vast group of individual and institutional stakeholders and areas along the Pacific coast. These three States, with the United States as the "middle State", as is the case for Mozambique, were partners on trade and environmental issues before the NAMPAN project commenced. This established pattern of cooperation facilitated the establishment of NAMPAN, which was suggested during a trinational workshop in1999. Canada, Mexico and the United States worked to establish NAMPAN with the support of the Biodiversity Programme of the Commission for Environmental Cooperation (CEC), a trinational intergovernmental organization.[19] Although the level of commitment to such initiatives fluctuates, there are never the less ongoing transboundary arrangements and further reinforcement of cooperation is expected.

In Africa, the idea of transboundary cooperation was first articulated by the Belgian colonial authorities in 1929 between Rwanda and Congo. Early in 1925, Africa's first national park was established by Belgium, covering the western half of the Virunga Mountains. In 1929, the Belgian authorities expanded Albert National Park to include all of the Virunga Mountains, which covered the two colonies of the Belgian Congo and Ruanda-Urundi. This initiative constituted the first incipient transboundary park. When the colonies gained independence in the 1960s, the park was split into the Virunga National Park of the Democratic Republic of the Congo and the Volcanos National Park of Rwanda [56]. However, Africa's first formally declared transboundary PA, the Kgalagadi Transfrontier Park, was established between South Africa and Botswana only in 2000. It is also in Africa, specifically in the Southern African Development Community (SADC) area, that one can find the only organization dedicated to promoting transboundary conservation programs—the Peace Parks Foundation.

[19] The CEC is an intergovernmental organization established by the three governments under the North American Agreement on Environmental Cooperation. It was created to address regional environmental concerns, to help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law.

Transboundary nature conservation has a long record in the EAME sub-region, having been formalized through following treaties:

(1) Treaty between the Government of the Republic of Mozambique, the Government of the Republic of South Africa and the Government of the Republic of Zimbabwe on the Establishment of the Great Limpopo Transfrontier Park (GLTP) established in 2002[20] [58];

(2) Bilateral Agreement between the Government of the Republic of Botswana and the Government of the Republic of South Africa on the Recognition of the Kgalagadi Transfrontier Park signed in 1999 [59];

(3) Treaty between the Government of the Republic of Namibia and the Government of the Republic of South Africa on the Establishment of the [Ai|Ais/Richtersveld] Transfrontier Park established in 2003 [60]; and

(4) Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol signed in 2000 [53]. The GLTP and the General Trans-Frontier Conservation and Resource Area Protocol offered the best prospects for providing a working legal and political basis for a TBMPA between Mozambique and South Africa.

The GLTP[21] served as one of the models for the implementation of the strategy presented in this article, once similar steps have been followed. First, the process has involved three countries, such as the case presented here. Second, after the signing of the MoU between the three countries, reflecting the political support, working groups were created under a technical committee, which was operational under the ministerial committee. To facilitate the process, an international coordinator was appointed, being

[20] The GLTP is a terrestrial protected area that became a reality in 2002, when the heads of State of Mozambique, South Africa and Zimbabwe signed an international treaty to establish this transboundary protected area. Its objectives are to foster international collaboration, enhance ecosystem integrity and natural ecological processes, generate revenue for local peoples, maintain a sub-regional economic base, and develop transborder ecotourism as a means for fostering regional socio-economic development [57]. The GLTP links protected areas already established (Kruger National Park in South Africa—19 031 km^2; Limpopo National Park in Mozambique—10 812 km^2; Gonarezhou National Park in Zimbabwe—4935 km^2), comprising a total area of about 35000 km^2. Kruger National Park was established in 1898; Gonarezhou National Park was established in 1934; and Limpopo National Park was proclaimed in 2001, replacing the Coutada 16 area. Despite the international treaty, the GLTP is yet to be officially opened.

[21] The process formally started in 1996 when the first negotiations occurred and a development plan was conceived for what would eventually be the GLTP. The memorandum of understanding for the GLTP was finally signed in November 2000 and the establishment treaty was formalized in December 2002. Both the GLTP and TIHPA represent formal transboundary protected areas with joint administration.

this position rotary every 2 years between the three countries. Finally, the process culminated on a high level meeting, where the trilateral treaty for the establishment of the GLTP was signed by countries involved. The technical committee was transformed in to a joint management board and working groups into management committees, which will deal with several issues, including conservation, legislation, resources and tourism [57]. In the case of the General Trans-Frontier Conservation and Resource Area Protocol, signed by Mozambique, South Africa and the Kingdom of Swaziland, it provides a legal and political basis, once it calls for the development of transfrontier conservation areas, and also for joint strategies for transfrontier planning and management and the establishment of mechanisms for joint supervision and decision-making between the three countries [54]. Although this general protocol does not refer explicitly to marine and coastal areas, it includes five protocols, one of which being the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol, referred above. This protocol refers to a TFCA between Mozambique and South Africa, focusing on marine and coastal environments, and thus constituted a main anchor for the steps to follow in the creation of the TBMPA at the Mozambique/South Africa border.

Although these models of transboundary protected areas provide useful lessons for decision-makers, any arrangements for a new transboundary conservation mechanism must be placed in the context of the EAME region. In particular, decision makers will need to take into consideration the unique features of the three States establishing transboundary mechanisms in the two border regions, with one State (i.e., Mozambique) having both of its borders covered. This almost unprecedented situation requires unique political, institutional and management arrangements from other marine conservation cooperation initiatives in the region.

3.2. Potential options

Mozambique, South Africa, and Tanzania, once took the political decision to cooperate in the establishment of transboundary conservation mechanisms to contribute to achieving their marine ecoregion conservation goals, had a range of diplomatic and management options to consider. These options are presented and discussed in turn below. One end of the range pointed to the least amount of cooperation, while the other end indicated the highest degree of cooperation. These options were considered at two levels: the first level hypothesized a trilateral approach, whereby Mozambique, South Africa, and Tanzania

agree to act in concert on a subregional basis; the second level considered the two transboundary sites separately in the event that the sites were not evenly prepared for transboundary conservation mechanisms. It was conceivable at the starting point that an option considered realistic for one transboundary site might not be desirable for the other site. Furthermore, even as both Tanzania and South Africa had moved to create MPA sat their borders with Mozambique, they were faced with the situation that Mozambique was still in the process of establishing MPAs at its borders with each of these countries. Neither the Mtwara Development Corridor to the north, nor the more specific General Trans-Frontier Conservation and Resource Area Protocol to the south, specifically address the TBMPA approach.

3.2.1. Option 1: independently established and managed MPAs on both sides of the border

Under this option, the neighbouring States could simply proceed with the establishment of MPAs within the irrespective maritime zones, guided by common ecosystem objectives. The three States could establish these independently, ideally in coordination, but not necessarily contemporaneously. The resulting MPAs on either side of the maritime boundary would be established in accordance with national laws and would only, therefore, be subject to the national planning and management regime. This approach partly reflects the starting situation as South Africa and Tanzania had already established MPAs in their border regions with Mozambique. Mozambique had yet to implement MPAs near either border. However, this situation was to change with the implementation of the Ruvuma-Palma National Reserve in the northern Mozambique and, particularly, the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol in the south border (between Mozambique and South Africa). Several precursors of TBMPAs in other regions (see Tables 1 and 2) started the process with a simple memorandum of understanding and independently established MPAs. For example, TIHPA took 20 years from the idea of a TBMPA to conclusion of the actual agreement between the governments of the two States. A similar approach could be followed at both borders with Mozambique, even as these autonomous processes continue. The three countries have already produced statements and agreements at a bilateral level that provide adequate ground for a step towards adoption of transboundary conservation mechanisms.

3.2.2. Option 2: independently established and managed MPAs, but including a regime of management cooperation through information-sharing

The second option is really just an extension of the first. Independently established MPAs in either or both of the border regions, which would be subject to a national planning and management regime, would be accompanied by the concurrent establishment of a management cooperation regime through information sharing. States on each side of the border would level the playing field in terms of scientific, technical and other information needs to encourage achievement of stated common ecosystem objectives. The three States could also embark on a coordinated monitoring programme. For example, the implementation of the TIHPA was fostered by the establishment of working groups, support from regional and international institutions, and guidelines development.[22] However, the ultimate decision-making authority within each MPA (e.g., whether there should be resource access, by whom, total allowable catch, seasons, etc.), would remain within each State. This seemed a viable option because of the existence of the Mtwara Corridor initiative in the northern border area and the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol in the southern border area. Although it would constitute a relatively low level of commitment, this would serve as an intermediate stage to achieving a TBMPA. Again, a memorandum of agreement, similar to that creating the TIHPA, or simply a joint declaration, such as the Tulum Declaration that initiated the MBRS,[23] would reinforce the political statements already produced at either a bilateral or trilateral level. Actually, this ended to be the way chosen by Mozambique government with the declaration, on the past 21 August, 2009 [61], of the Ponta do Ouro Partial Marine Reserve with an area of 678 km^2 stretching

[22] The goal of this TBMPA plan is the sustainable use of natural resources, which calls for a gap analysis in management and training needs, forward looking management plans, and training programmes. Both governments have also identified development of an ecotourism programme as a priority. Today, TIHPA serves as a model for future transboundary marine parks around the world.

[23] The process of establishing the MBRS project started with the Tulum Declaration in 1997, a joint declaration that called on the four littoral States of the MBRS and its partners in the region to join in developing an action plan for its conservation and sustainable use. The four countries were already signatories of the main international conventions on the environment, as well as of several regional conventions (e.g., 1991 the Tuxtla Mechanism, a presidential agreement between Central America and Mexico concerning projects supported by international cooperation; the 1992 Convention for the Conservation of Biodiversity and the Protection of Priority Wild Areas in Central America, concerning protected boundary areas; and the 1995 Mesoamerican biological corridor). The MBRS Project had its official launch in Belize in June 2001 in the presence of the Prime Minister of Belize and Ministers of the Environment from the Mesoamerican States. This represented the first phase of a 15-year conceptualized programme.

three nautical miles out to the sea and aiming the "protection of coastal marine species and their habitats". Thus a process initiated 5 years before gave birth to 300 km of MPAs extending from Maputo Bay in Mozambique, to Cape St. Lucia in South Africa, the Southern boundary of the iSimangaliso Wetland Park. Furthermore, a transfrontier task team, consisting of relevant agencies[24] from both countries is foreseen, in order to coordinate oversight of shared resources.

3.2.3. Option 3: coordinated establishment and management of MPAs

This option would see the establishment of national MPAs on both sides of the border, with a higher degree of cooperation in the planning, designation and management of the MPAs than in the first two options. Option 3 entails significant bilateral technical cooperation, extending beyond a regime of information sharing to include common consideration of issues such as ecosystem objectives, no-take zones, and resource access. This option requires higher degrees of political and bilateral commitments by the respective bureaucracies of the three States. Leading agencies should be identified (as in TIHPA) and bilateral or trilateral consultation committees created as *fora* for consultation and coordination in the management of resources and for the development of efficient management guidelines and measures. Again, the MBRS project offers a model to consider as it involves two border commissions at the north and the south of a central State.[25]

3.2.4. Option 4: joint establishment of two transboundary MPAs

[24] Particularly the Transfrontier Conservation Areas Unit of Mozambique and the iSimangaliso Wetland Park.

[25] The MBRS Project established two transboundary park commissions for the management of shared marine and coastal resources: the Transboundary Park Commission of the Northern Zone (BEMAMCCOR—Belize-Mexico Alliance for the Management of Common Coastal Resources), comprised of Mexico and Belize, and the Transboundary Park Commission of the Southern Zone (TRIGOH—Tri-National Alliance for the Gulf of Honduras), comprised of Belize, Guatemala, and Honduras. These commissions serve as a forum for consultation, coordination, convergence and mutual effort in the management of resources, and they have provided a series of guidelines and measures for the efficient management of the MBRS. More specifically, features addressed in the MBRS project include the: (i) establishment of new protected areas and strengthening of existing ones; (ii) strengthening of regulations; (iii) evaluation of community-based alternative livelihoods to reduce the impacts of fisheries; (iv) assessment of limiting factors; (v) analysis of load capacity of TBMPAs; (vi) expansion of a conservation investment matrix/map that identifies key conservation partners, their levels of investment, main strategies, expected impacts and stressors of the Mesoamerican Reef System; (vii) identification of areas of overlap and potential collaboration; and (viii)ecotourism planning.

Option 4 requires a high degree of political commitment between the three States, for either or both sites. Unlike the first three options, this option would have the neighbouring States jointly designating the TBMPA independent of the steps already taken at the national level by Tanzania and South Africa. Further, the TBMPA would not be managed as two separate areas at the national level, but rather through a joint commission composed of administrative, scientific and technical personnel. This option would require a complex agreement setting out the mandate of the authority, delegation of powers and functions, establishment of working relationships between the national enforcement authorities on both sides of the border at the two sites, arrangements that would enable the implementation of commission-directed measures, development of an appropriate legal framework at both the bilateral and national levels, provisions for funding, and a dispute settlement mechanism. Some of the foundations for this option result of the Mtwara agreement and the Lubombo Ponta do Ouro-Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol and could be developed under a roadmap model similar to the NAMPAN Project,[26] which was formally initiated with a trinational workshop in1999. Further, the three countries share strong bilateral and trilateral commercial and political relationships under SADC, which could serve as an umbrella agreement similar to that of the North American Free Trade Agreement (NAFTA).[27] The model of the Wadden Sea is also relevant as it includes a trilateral government conference and strong mechanisms for trilateral management, which are supported by expert groups and a common management plan.

3.2.5. Option 5: trilateral sub-regional diplomatic and management agreement

[26] US President George W. Bush, Canadian Prime Minister Stephen Harper, and Mexican President Felipe Calderón identified work under the NAMPAN as a "key accomplishment" in a joint statement issued on August 21, 2007, at their meeting in Montebello, Quebec: "To improve the ecological health of our shared marine resources, our governments continued to expand the North American Marine Protected Areas (MPA) Network. The Network will use our countries' marine protected areas in the development of a tri-national MPA-based monitoring programme stretching from Baja to the Bering Strait" [62].

[27] The NAMPAN project complements the environmental provisions of NAFTA. The goal of NAMPAN is to work with a tri-national, multi-sectoral group of stakeholders to establish an effective system of North American MPA networks to enhance and strengthen protection of marine biodiversity. Currently, the project addresses targets from the 2003 Strategic Plan for North American Cooperation in the Conservation of Biodiversity [63], coordinated by the CEC. The first goal (out of six) of the Strategic Plan is to promote cooperation for the conservation and maintenance of North American regions of ecological significance. To be included in NAMPAN, the MPAs need to contain biodiversity that is shared by the three States and is threatened and already subject to join efforts. Further, the MPAs also need to be able to share information, institutional capacity, and infrastructure, and demonstrate a high chance of success, visibility and public support.

This fifth and final option could be considered an extension of option 4, but with added value at the sub-regional level. In pursuit of common marine ecoregion conservation objectives, the three States could consider a sub-regional agreement under the Nairobi Protocol Concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region, 1985 [64]. The added value of this approach is a higher degree of integration of cooperative conservation efforts pursuant to the United Nation Environmental Programme's Regional Seas Programme regime commitments of the three States. A formal trilateral treaty model could be based on the experience of GLTP with its international technical committees, joint management board, and Tri-National Ministerial Committee. Although in the EAME case the two areas are separated, if we consider the MBRS lessons regarding anchoring MPA management in both international and regional conventions, the region could adopt a similar system for the protection of a marine ecoregion. Again, lessons learned from the Wadden Sea experience, particularly those concerning trilateral cooperative arrangements, could be supportive of this approach. The Wadden Sea initiative also has benefited from the inclusion of measures from various international and regional instruments (e.g., PSSAs established by IMO, the Convention for the Protection of the Marine Environment of the North-East Atlantic, the Convention on the Protection of the Marine Environment of the Baltic Sea Area, the Natura 2000 Network, and the European Union's Common Fisheries Policy). This initiative offers a good example of a multinational marine protection approach based on international instruments and national protected areas that is anchored by trilateral cooperation.

3.3. Strategic relationship between options

The above options can be considered as either alternative courses of action, or as a stepped approach to reaching the highest degree of transboundary marine conservation cooperation at the sub-regional level. There can be various reasons why three States might not be willing to proceed immediately with the highest degree of cooperation in a marine setting, or to cooperate as intensively as they do for transboundary terrestrial protected areas. First, they might not be ready politically, possibly because of an outstanding bilateral issue such as the undelimited territorial sea and EEZ boundaries between Mozambique and South Africa, or the perception that a TBMPA might affect either State's position in delimiting these boundaries. Nevertheless, this was precisely the situation faced by Malaysia and the Philippines in establishing TIHPA and it did not impinge on the creation of the TBMPA. Second, the three States might be concerned over

their lack of understanding of the shared marine environment and the commitments they would assume under a TBMPA. This suggests that they might want to take a more cautious, incremental approach and increase their cooperation and commitments as their knowledge base grows, which seems to be the present situation. Third, the three States might not be ready to commit substantial resources to establishing a TBMPA due to other socio-economic and ecological priorities, and thus would prefer to proceed with the "least-cost" cooperative option as an initial step. However, the three States might have access to international donor or NGO resources for an inception period, which could lead to a higher degree of cooperation as more joint activities could be funded. At the same time, they might be concerned over the sustainability of externally funded initiatives after that funding terminates, and therefore would prefer a low-intensity, and conceivably more sustainable, type of cooperation.

The decision to proceed with anyone of these options, or to use them sequentially, is most likely to be influenced by the reasons appointed above in this sub-section. The decision(s) to establish transboundary marine conservation mechanisms and the cooperative options explored will also be influenced by the perception from the three States that such a network will assist them in reaching their 2012 MPA targets, the benefits to be derived from transboundary (in comparison to national) conservation mechanisms,[28] and their ability to commit resources (e.g., personnel, assets, and funding).

4. ACTIONS TO FACILITATE THE ESTABLISHMENT AND MANAGEMENT OF TRANSBOUNDARY MARINE CONSERVATION

4.1. Aligning international commitments

In addition to any domestic and bilateral actions the three States might take to cooperate on transboundary marine conservation, they would benefit from the alignment of their commitments to international marine and environmental legal instruments. Mozambique, South Africa, and Tanzania are parties to some of the most relevant international instruments concerning nature conservation and marine environmental protection.

[28] A transboundary approach to conservation reflects a stronger political commitment of the States involved, responding to the international call which states that global targets could only be achieved through international cooperation and cooperative conservation, at least at the level of the ecoregion. Further, the image of the three States will be reinforced through this common position, showing a common will and efforts to achieve international targets.

Nevertheless, there are important instruments in relation to which their practices diverge. For example, under MARPOL73/78 [65], it would be possible to secure, through IMO, the designation of special areas under Annexes I (oil), II (noxious liquid substances) and V (garbage), for the TBMPAs. The value of such designation is that higher standards could be applied for pollution control measures from international shipping operations. This has recently been accomplished for a large area of South Africa's EEZ for Annex I purposes. Discharges (frequently illegal) of a variety of ship-generated wastes area problem on the major international navigation route along the east coast of Africa. At this time, all of three States are Parties to MARPOL, significantly enhancing the possibility of obtaining special area status for both border regions.

Mozambique and Tanzania are parties to the International Convention on Oil Pollution Preparedness, Response and Co-operation [66], which offers an opportunity for joint spill contingency planning and response. Both Tanzania and South Africa are parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter [67]. The creation of TBMPAs, for instance, could benefit from the cooperative regulation of waste discharge in the area if Mozambique becomes a Party to the Convention.[29]

Insofar as South Africa has ratified the International Convention for the Regulation of Whaling [69], but neither Tanzania nor Mozambique have ratified it, the designation of sanctuary areas for whales might be impeded. Since the transboundary areas of these three States are considered to be highly important for several whale species (see Section 2), it appear that both Mozambique and Tanzania will need to undertake special measures in order to achieve a higher level of protection for these species, namely to accede to the Whaling Convention.

Although the three countries are parties to the World Heritage Convention [70] and the Ramsar Convention [71], nevertheless both instruments have been barely used by both Tanzania and Mozambique. However, in the study areas, several sites have the necessary characteristics to be considered under these conventions, thus reinforcing the international status of the protected areas. This was precisely the option taken by the

[29] In 1996, the London Convention was overhauled by the Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter [68] and resolutions adopted by the special meeting, but of the three States, only South Africa is a Party.

Mozambican government regarding the Ponta do Ouro Partial Marine Reserve as its creation was previously accompanied by the submission of the area to UNESCO World Heritage List.[30]

As the central State geographically, and considering the creation of MPAs in both Tanzania and South Africa, it seemed clear that it was up to Mozambique to proclaim MPAs within its borders, if it was to give substance to the international commitments it has assumed together with Tanzania and South Africa. Nevertheless, and whatever option is followed, for the three States to move forward with the transboundary marine conservation, several issues remain to be addressed, including: (1) harmonisation of the management options and development models at the borders, i.e., as are already pointed out for both the Mtwara corridor initiative and the Lubombo Spatial Development Initiative (namely the General Trans-Frontier Conservation and Resource Area Protocol and the "Lubombo Tourism Route"); (2) harmonisation of fisheries management measures, particularly regarding offences and penalties, taking into consideration the provisions of the FAO Code of Conduct for Responsible Fisheries [72], the SADC Protocol on Fisheries [73], and the INFOPÊCHE agreement [74] (providing that Tanzania and South Africa adopt the latter agreement); and (3) implementation of the mechanisms set out in both the Mtwara initiative and the General Trans- Frontier Conservation and Resource Area Protocol (as well as in the Nairobi Convention) concerning the sharing of scientific information.

4.2. Settling an outstanding maritime boundary

The lack of a delimited maritime boundary between Mozambique and South Africa seemed to be a constrain to the creation of a southern TBMPA. At this time, the full extent of application of each State's laws and enforcement jurisdiction is unclear in the disputed area. The delimitation of the maritime boundary (consisting of the territorial sea, the EEZ, and the continental shelf) would clarify jurisdictional issues between the two countries and facilitate marine conservation cooperation, including enforcement. Nevertheless, this should not be an impediment to progress towards a TBMPA, as was shown by the TIHPA where a similar problem existed. Also in the present case, it became it was not an unsurpassable obstacle, although based on a "lighter" level of commitment.

[30] Submitted on 20/8/08 Criteria (VII) (X), Ref.:5382.

4.3. National MPA policies

At the national level, all three countries enjoy consistent legal frameworks for the establishment of MPAs.[31] None of the countries seems to have adopted stand-alone MPA policies. Instead, the policy framework for MPA establishment is found in broader policy documents relating to the environment, biodiversity, fisheries, or coastal zone management. If the three countries are to establish transboundary/regional conservation mechanisms, they might consider clarification of the role this approach (i.e., transboundary) is to play in marine conservation at the national level. Furthermore, in the establishment of TBMPAs, the countries will have to agree on common procedures for MPA review and implementation.

4.4. From idea to realization

An important first step towards the establishment of transboundary conservation mechanisms in the EAME region was the general political commitment that has been expressed by Mozambique, Tanzania, and South Africa at the 5th World Parks Congress in 2003. Against this political backdrop, the designation and operationalization of TBMPAs are conceivable through a strategy based on a series of consecutive, and possibly parallel, steps.

A danger with MPA designation that is hurried and involves only the bureaucratic and intellectual elite is a lack of stakeholder support and sustainability. It is fundamental that participatory rights and processes relate to the expectations of communities and stakeholders in the decision-making process for establishing TBMPAs. According to Pomeroy *et al.* [76], if there is inclusive participation of stakeholders, they are more likely to develop a sense of ownership and be compliant with management measures. Generally, without local support, MPAs will probably fail [14]. Local communities and stakeholders living and working in or near the sites to be preserved need to have their rights identified and, where appropriate, safeguarded. Although States involved seemed to have chosen a bilateral approach based on national declarations of MPAs together with the constitution of transfrontier task teams, instead of following a trilateral common way, it may be considered a theoretical roadmap if such an option was to be taken. It must be also kept in

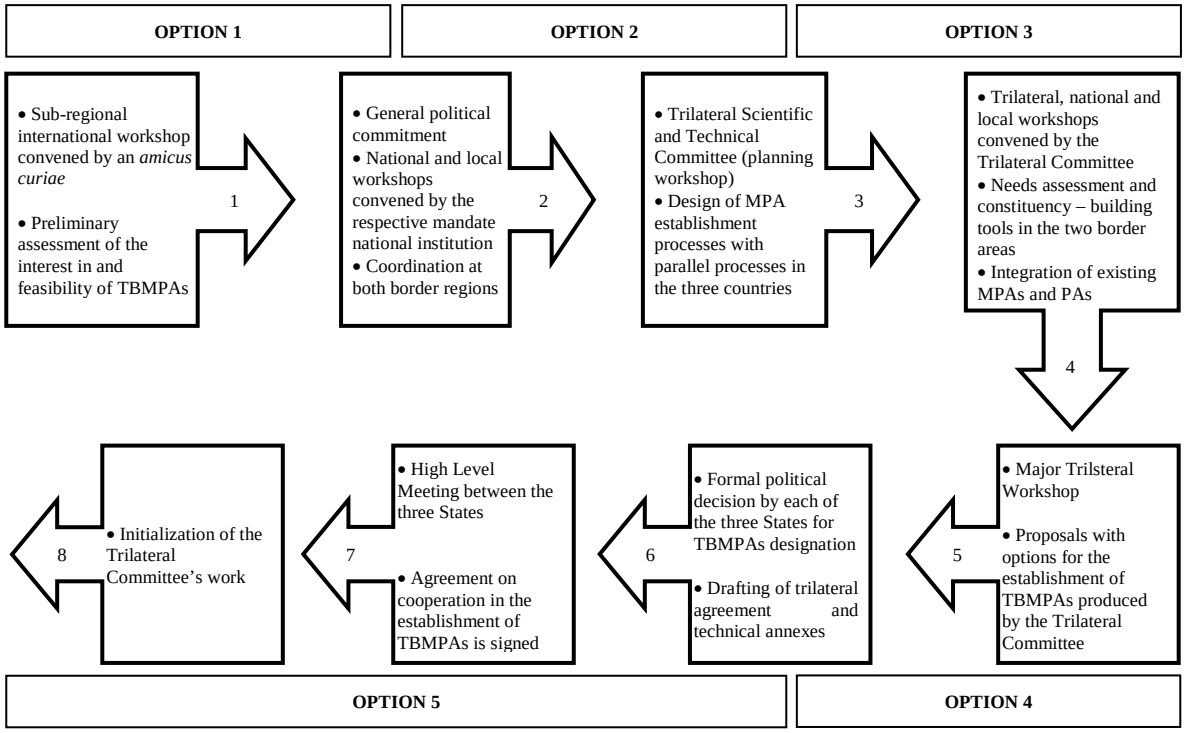
[31] The national legal and institutional frameworks for MPAs are analysed in another paper [75].

mind that the state of the art at the field still allows that evolution, if States agree with a progressive level of commitment, as stated before.

4.4.1. An alternative or evolutionary approach to the designation of TBMPAs

The stepped approach to the designation of TBMPAs proposed below encourages meaningful involvement of stakeholders and convergence of efforts among key actors, both of which are important issues in MPA making. The strategy proposed (see Fig. 2) is equally applicable to any of the cooperative options identified.

Figure 2 - Proposed strategy for the development of TBMPAs in the two border areas. Description: Figure shows the stepped approach of the strategy proposed (in the large boxes). The small boxes reflect the correspondence between the steps of the strategy and the diplomatic and management options described in the paper. Legend: TBMPAs—transboundary marine protected areas, MPAs—marine protected areas, PAs—protected areas.



First, and as a catalytic activity, a sub-regional international workshop would be convened, involving senior officials from national institutions tasked with MPA-making responsibilities, MPA managers, scientists, academics, community representatives and NGOs from the three States, including participants from their border regions.[32] Preparatory work for this workshop would need to map out key institutions, stakeholders and actors, as well as secure funding for the TBMPA implementation process until the three States are in a position to assume full funding responsibility for the TBMPA. The

[32] The workshop could be, as an example, convened and facilitated by an *amicus curiae* (i.e., someone that is not an involved Party). This could be a highly respected international NGO active in the region.

workshop would be an important first step at networking between the respective MPA constituencies in each border area and to ensuring an inclusive and participative approach from inception of the MPA-making process. Participants would exchange views on the utility of MPAs and how MPAs could serve as tools to achieving socio-economic and conservation objectives. The state of knowledge for the two areas and capacity- building needs would need to be identified. The workshop report would provide a preliminary assessment of the interest in, state of the art and general feasibility of TBMPAs in the sub-region. The report would serve as a working document and would be followed by a series of scientific and feasibility studies, ideally facilitated by the *amicus curiae*. The report and related studies would be communicated to key government institutions in the three States.

Second, given that there is already a general political commitment to the establishment of TBMPAs and steps taken by each country, each national institution that has the mandate to lead the MPA-making process would continue the step one workshop process within their respective country. At the national level, there will be an opportunity to engage a broader range of governmental actors than in the preceding step. Ideally, the national workshops in the two border areas would be coordinated and aim to secure further political and bureaucratic support. At the local level, the stakeholder constituency would also be broadened to involve coastal communities, local governments, and the commercial sector. These actions will be vital to securing support for, and eventual compliance with, the TBMPAs. Coastal communities along the two border areas would be sensitized to the need for cross-border support to achieve transboundary objectives.

Third, political and bureaucratic support at the national level would need to converge into a trilateral technical process. With the support of ministries of foreign affairs, this could consist on the establishment of a trilateral scientific and technical committee (Trilateral Committee) and the convening of a trilateral planning workshop at which goals, frameworks, roles, and next steps are identified. The members of the Trilateral Committee would be technical, not political, personnel. From this point onwards, the Trilateral Committee would play a steering role to the process, ideally with the continued assistance and support of the *amicus curiae*. The Trilateral Committee would consider the processes through which TBMPAs are (were) designed and how to

coordinate the process in one country with the parallel process in the adjacent country.[33] Commitment to a "bottom-up" process should be agreed upon for the eventual national designation and management of MPAs, or portions thereof, on either side of the border. This approach would be consistent with the emerging trend identified in the region by Francis *et al.* [18].

Fourth, the Trilateral Committee would convene a series of trilateral, national and local workshops addressing relevant conservation (scientific) and developmental (socio-economic) issues. These workshops would facilitate information and knowledge sharing and further build constituencies in the border regions. The workshops would also play an important role as a constituency-building tool and provide structured inputs into the Trilateral Committee. The workshops consider ways on how existing MPAs and PAs in the two border regions (namely, MBREMP, QNP, and IWP) could be integrated into TBMPAs. A needs assessment for each of those areas would be required to determine how the TBMPA initiative would strengthen and coordinate with broader conservation and socio-economic objectives.

Fifth, a major trilateral workshop would be convened at which the Trilateral Committee proposes options for the establishment of TBMPAs.[34] The proposal would draw on the inputs from the earlier workshop and information gathering processes and set out advantages and disadvantages for each option.

Sixth, possibly following internal consultations and further diplomatic and bureaucratic exchanges, each of the three States would make the formal political decision to proceed with the formal designation of TBMPAs in their respective border areas. This decision would be followed by a high level meeting between the three States. The Trilateral Committee, in cooperation with the respective ministries of foreign affairs and national MPA lead institutions, would draft (1) the trilateral agreement, which would serve as framework for TBMPA cooperation between the three States, and (2) technical annexes spelling out the designation, structures, processes and financing of the two TBMPAs.

[33] In present situation, how to coordinate the different processes going on at different stages, in the three different countries.
[34] In the present situation, how to move on to real TBMPA situation starting on the national declared MPAs, although under the umbrella of regional agreements and the declared intention to constitute TBMPAs.

Seventh, a high-level meeting between the three States would be convened during which an agreement on cooperation in the establishment of TBMPAs would be signed. The Contracting Parties would resolve to reconfirm the membership of the Trilateral Committee to authorize the formal commencement of its work.

Eight, the Trilateral Committee establishes and manages the two TBMPAs in the region.

5. CONCLUSION

As the international community struggles to meet the 2012 targets for marine conservation, marine transboundary conservation is increasingly being seen as an effective mechanism for addressing the ultimate goal of protection at the level of biogeographic region and establishment of a "global representative system" of MPAs.

Notwithstanding difficulties of implementation, TBMPAs are seen as a key mechanism for protection of marine ecoregions. Despite the pioneering initiative of TIHPA in 1996, there is still a long way to go before the creation of networks of TBMPAs is a commonly used tool worldwide. Although political will may exist among States sharing borders, the complexity of moving beyond a bilateral approach (such as in TIHPA) to a multinational/sub- regional level often seems to be a too big obstacle to overcome. Even in the EU, the issue of transborder cooperation regarding marine conservation is only now really kicking off in the context of the European MPA network (Nature 2000) and the Marine Strategy Framework Directive [77]. A multi-scale approach, such as the one proposed by Fanning *et al.* [78] for a large marine ecosystem (LME) governance framework, with vertical linkages between the global, regional, national, and local policy cycles, will be crucial to the success of any TBMPA initiative. Further, the multiplicity and diversity of stakeholders involved in the policy cycle will affect each stage of the TBMPA decision-making process.

With regard to political arrangements, within a multilateral agreement, States tend to follow different degrees of commitment ranging from the lower level of a memorandum of understanding that is based on a nationally declared and managed MPA (which can be bilateral), to the higher level of a sub-regional treaty among States with a real TBMPA and joint administration. This article intended to demonstrate that among these two extremes there can be a solution phased in a step-by-step level of options to facilitate accommodation of site-specific issues and unique approaches to bilateral

issues.[35] Furthermore, a clear roadmap encouraging meaningful involvement of stakeholders and convergence of efforts among multiple key actors is considered to be a decisive approach to a real designation of TBMPA and not simply two MPAs on each side of the border.

In the present case study, the political decision to create TBMPAs between Tanzania, Mozambique, and South Africa is anchored, at the global level, in the CBD and UNCLOS [79], and at a regional level in the Nairobi Convention and the SADC Protocol, as well as sustained by bilateral agreements such as the Lubombo Ponta do Ouro–Kosi Bay Marine and Coastal Transfrontier Conservation and Resource Area Protocol.[36] However, at the national and, in particular, the local levels, moving forward on MPA development depends (and depended) on the readiness of each State, its institutional and legal frameworks, and involvement of all of the stakeholders. A common pattern emerges from the case studies analysed here in terms of the process to be followed: a "starting meeting" or sub-regional workshop to prepare for the necessary political decisions and the procedural measures to implement a TBMPA following the declaration of a "common will" among States to develop a TBMPA.

This case study involving Tanzania, Mozambique, and South Africa in the EAME and analysis of existing models suggests a possible approach to the development of TBMPAs at the biogeographic or subregional level. When more than two States share a common political will to move forward with a TBMPA but simultaneously face national and site constraints, a single "top-down" solution might not be possible. The *status quo* hypothesis (H_0) suggests that for those States, TBMPA development will remain a theoretical political and social abstraction. The challenge is to develop a range of solutions that can simultaneously accommodate bilateral realities and coexist under the multilateral umbrella. Ultimately, such an approach can lead the different "streams" in to the "bigger river" of a treaty without demanding too much of each Party at the beginning (and thus putting at risk the final aim, i.e., transboundary marine conservation). Different border realities most surely demand different solutions that are not only multi-scale but also multivariate in nature, and are supported by a common baseline. Eventually, these

[35] For example, in the present case study, the undelimited maritime boundary between Mozambique and South Africa.
[36] See this on Guerreiro *et al.* [80].

approaches will converge into a homogeneous political reality, within a commonly accepted framework.

Reality showed in the present case that TBMPA between countries not sharing the same borders seems to follow, at least in its early stages, bilateral approaches instead of a concrete multilateral commitment. Nevertheless, this starting point can be faced and managed as a first step for a formal transboundary multiple commitment regarding marine conservation.

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The authors do not have any disclosure statement to proceed. All the authors have approved the final article.

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GLOSSARY

Marine Protected Area: Any area of intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment.

Transboundary Marine Protected Area: [A]n area of land/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituting parts are especially dedicated to the protection and maintenance of biological biodiversity, and of natural and associated cultural resources, and managed co-operatively through legal and other effective means.

Marine Protected Areas Network: Collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designated to meet objectives that a single reserve cannot achieve.

9. INSTITUTIONAL INTERPLAY IN MPA NETWORKS

GRILO, C., (*In Press*). "Institutional Interplay in Networks of Marine Protected Areas with Community-Based Management", *Coastal Management* 39(4):XX-XX.

Abstract: Institutional interplay, or the ability of one institution to affect another, is a key feature of multi-level environmental governance that can influence the performance of institutions, such as marine protected areas (MPAs). In the Western Indian Ocean (WIO), MPA networks are being created to meet top-down, internationally defined MPA targets, while simultaneously there is a strong regional focus on bottom-up, community-based marine management. These apparently contradictory trends can be bridged through MPA networks that include community-based MPAs. To explore whether institutional interplay affects the success of such MPA networks, and to provide guidance for MPA-making in the WIO, the literature on ten geographically diverse MPA networks with community-based MPAs was reviewed. Because this is a first exploration into the topic, not all causal links between institutional interplay and MPA effectiveness could be confirmed, neither was any indication of interplay-related costs found. However, the analysis suggests that institutional interplay is generally concerned with information exchanges and issues of control and authority and seemed to have positive effects on MPA success. As MPA networks expand in the WIO, MPA practitioners and managers in the region may consider different forms of institutional interplay to be tailored to their specific management and financial contexts.

Keywords: MPA networks, community-based MPAs, institutional interplay

1. INTRODUCTION

Environmental governance systems consisting of multiple institutions at various levels of organization are important for managing global commons because they can address threats at the international, national and local levels (Berkes, 2006, 2007; Dietz *et al.*, 2003). This is also the case of many marine resources. Multi-level institutions governing them can independently meet conservation targets, but because such

institutions do not exist in isolation from each other, the interactions between them may influence each others' performance.

Institutional interactions, or institutional interplay, are "situations where the contents, operation or consequences of one institution …are significantly affected by another" (Stokke, 2001). Institutional interplay is an important feature of international environmental governance (Young, 1996). It is also important for environmental conservation at lower levels (Cash *et al.*, 2006; Ostrom *et al.*, 1999; Young, 2002). For example, institutional interplay has simultaneously advanced and complicated the implementation of the Habitats Directive in the European Union, through the ability of environmental NGOs to influence EU policy-making and through a mismatch between EU and national priorities, respectively (Paavola *et al.*, 2009). In the marine realm, insufficient interaction between biodiversity conservation regimes and fisheries management regimes has precluded biodiversity concerns from being reflected in fisheries management decision-making at regional and national levels (Hoel, 2003). There are also insufficient interactions between global and local levels of decision-making pertaining to marine protected area (MPA) creation and management (Pajaro *et al.*, 2010). One way of overcoming this is to integrate top-down approaches to MPA-making with bottom-up ones, for example through the establishment of MPA networks that integrate community-based MPAs. These MPA networks go a step beyond community-based design of MPAs (e.g., Ban *et al.*, 2009). They are a viable option in the Western Indian Ocean where MPA-making is essentially driven by international commitments (Wells *et al.*, 2007) but cannot ignore local approaches to marine management (Francis *et al.*, 2002).

The overall goal of this exploratory paper is to provide insights into how institutional interplay can contribute to the integration of top-down and bottom-up marine conservation approaches. Specifically, it sets out to determine whether institutional interplay affects MPA success, by focusing on the particular case of MPA networks with community-based MPAs. The paper contributes to the growing MPA literature, and extends the application of the institutional interplay concept to the MPA field by examining ten MPA networks with community-based MPAs created in different geographical contexts. Most of these MPA networks are still in the planning and implementation phases. Consequently, the results of this research are rather preliminary, but they are also important at this point in time when so many countries are setting up

nation-wide MPA networks. The rest of this paper is organized as follows: first, the emergence of MPA networks with community-based MPAs in the Western Indian Ocean and their importance are explored; this is followed by an explanation of the theoretical underpinnings of institutional interplay. Then a brief description of each of the ten MPA networks, providing evidence of institutional interplay and its consequences; and finally a discussion of these institutional interactions and policy implications for the Western Indian Ocean.

2. MPA NETWORKS WITH COMMUNITY-BASED MPAS

The differences between global and local levels of decision-making pertaining to MPAs are visible in the approaches adopted for MPA-making and management. Globally, the creation of MPAs is a priority for many inter-governmental organizations, States and non-governmental organizations (NGOs), and is supported by targets set internationally. These targets are to be achieved preferentially through the establishment of representative networks of MPAs (IUCN-WCPA, 2008; Laffoley, 2008). MPA networks generally require a top-down approach to creation and, more limitedly, to management. They can be more efficient than single MPAs at protecting marine biodiversity if they are designed according to scientific criteria, instead of being opportunistically created (Roberts *et al.*, 2003). In contrast, and at the local level, community-based management has gained popularity for providing wide participation and empowerment of local communities and integrating conservation and development concerns from the bottom-up (Berkes, 2004, 2007; Christie & White, 1997). While community-based management is not a panacea, community-based MPAs have been reasonably more successful in simultaneously achieving conservation and development goals than other types of MPAs, particularly in developing countries (Christie & White 2007; Cinner *et al.* 2005).

In the Western Indian Ocean, several MPA networks are being designed at the regional (i.e., Western Indian Ocean and East Africa Marine Ecoregions), national (i.e., Tanzania, Madagascar, and Seychelles) and sub-national (Rodrigues Island, in Mauritius) levels (UNEP-WCMC 2008). In this region, the trend toward top-down, science-based MPA networks also contrasts with the emergence of community-based MPAs (Francis *et al.* 2002), and the greater attention paid to community-based marine management in general (Wagner, 2004, Cinner *et al.* 2009).

Top-down and bottom-up trends in marine management in general, and in MPA-making in the Western Indian Ocean in particular, can be reconciled (Hildebrand, 1997; Qiu *et al.*, 2009), and may converge as MPA networks[1] with community-based MPAs.[2] Such MPA networks are attractive because they combine science-based MPA network design aimed at meeting international conservation targets, with the more participatory management that is often achieved with community-based MPAs. MPA networks with community-based MPAs are also desirable for "restraining" top-down and bottom-up trends (Hind *et al.*, 2010). This "middle ground" can distribute and balance some power and responsibility between multiple levels of management (Jones, 2002), and connect global MPA initiatives to the local realities where MPA implementation occurs (Pajaro *et al.*, 2010). MPA networks with community-based MPAs may be desirable for combining different levels of organization, and for enabling coordination among them, which is an essential condition for MPA network success (Christie *et al.*, 2009; Pollnac *et al.*, 2001; White *et al.*, 2002). In such MPA networks, a centralized management body may be necessary to coordinate activities in the several MPAs, as these may have distinct objectives. In addition, community-based MPAs are more susceptible to failure if no linkages are established with higher-level institutions (Folke *et al.*, 2007). Also, management authorities of an MPA network with community-based MPAs will probably refrain from dictating rules without consulting local constituencies, and consequently less likely to be seen as outside interference (Ostrom *et al.*, 1999). In turn, community-based MPAs may expect to have their authority and decision-making capacity recognized, so that their members may establish enforceable rules more easily (Ostrom *et al.*, 1999).

MPA networks with community-based MPAs can be considered an example of polycentric governance of the marine environment that aims at its protection from damaging activities, by connecting governmental management with community-based management. Hence, they present an important opportunity to investigate institutional interplay in the governance of marine commons. This is significant because neither MPA

[1] For the purpose of this paper, an *MPA network* is defined as "a collection of individual MPAs or reserves operating cooperatively and synergistically, at various spatial scales, and with a range of protection levels that are designed to meet objectives that a single reserve cannot achieve" (IUCN-WCPA, 2008). Consequently, MPA networks that were not designed to a significant extent according to scientific criteria were not analyzed. Supra-national MPA networks were also excluded because the involvement of two or more national jurisdictions would further complicate the analysis.

[2] MPA networks with *community-based MPAs* are considered to be those with at least one MPA "where the management authority and responsibility rest[s] with indigenous peoples and/or local communities through various forms of customary or legal, formal or informal, institutions and rules" (Dudley, 2008).

networks with community-based MPAs, nor institutional interplay in MPA networks in general, have received much attention. In fact, most literature on MPA networks deals almost exclusively with their ecological dimension (e.g., Murray *et al.*, 1999; Roberts *et al.*, 2003). In the few cases where processes of implementation of MPA networks with community-based MPAs are explicitly addressed (Green *et al.*, 2009; IUCN-WCPA, 2008; UNEP-WCMC, 2008; World Bank, 2006), a discussion of institutional interplay is usually lacking. The rare exceptions (e.g., Armada *et al.*, 2009; Eisma-Osorio *et al.*, 2009; Lowry *et al.*, 2009) are geographically restricted, and can only provide limited insights into institutional interplay within such MPA networks and its impact on their effectiveness.

3. INSTITUTIONAL INTERPLAY

Institutional interplay is one of the main factors affecting the performance of institutional arrangements (Young, 2005). Specifically, it is considered an important determinant of environmental regimes' ability to identify and solve environmental problems (Cash *et al.*, 2006), to meet multiple objectives (Berkes, 2007), and to be resilient (Ebbin, 2009). In essence, institutional interplay's relevance stems from the recognition that one environmental problem may be governed by various institutions at the same time, and that institutions do not act in isolation from each other. Institutional interplay has been mostly studied at the international level (e.g., Gehring & Oberthür, 2009; Stokke, 2001), and proposed conceptual frameworks are still expanding in scope to also include domestic regimes and actors (Stokke, 2001). Nevertheless, five distinctions are generally accepted regarding the identification of institutional interplay, its drivers, and levels of organization involved, direction, and effects.

The first distinction concerns the criteria for the identification of institutional interplay. Influence must originate from a *source institution* (independent variable); then, a *target institution* (dependent variable) must be susceptible to that influence; and finally, there is an effect that is explained and accounted by a *causal relationship* between the two (Gehring & Oberthür, 2009). For example, a network of shorebird reserves (i.e., source and target institutions) was developed and, among other things, created a successful research and monitoring program that identifies the main threats to shorebirds and how their populations oscillate (i.e., causal relationship) (Wilson, 2008).

Secondly, institutional interactions may either be driven by the inherent condition of the environmental problem at stake, or by the intention of intervening actors. Unintended, *functional* linkages occur "when the substantive problems or activities that two or more institutions address are linked in biogeophysical or socioeconomic terms", while purposeful, *strategic* linkages exist "when actors seek to forge connections between or among institutions intentionally in the interests of pursuing individual or collective goals" (Young, 2002). The biodiversity and climate change international regimes are functionally linked because the success of the latter will affect the former's (Kim, 2004). In contrast, the United National Convention on the Law of the Sea resulted from strategic linkages between different issue-areas - such as navigation and marine scientific research - that are functionally unrelated but, along with many others, share the same geographical space.

Thirdly, institutional interactions may involve institutions at different levels of organization (*vertical* interplay), or institutions at similar levels of organization (*horizontal* interplay) along the jurisdictional scale (Young, 2006; Young, 2002). Horizontal interplay has received more attention from scholars than vertical interplay (e.g., Gehring & Oberthür, 2008; Kim, 2004) because of the former's prevalence in the international arena. The interplay between international trade regimes and environmental regimes is a case in point because of the ability of the former to preclude the effectiveness of the latter (McLaughlin, 1994). However, interest in vertical interplay is on the rise in connection with issues of scale in the management of global commons, in particular, concerning how international and national institutions impact the effectiveness of, respectively, national and local ones (Berkes, 2006; Cash *et al.*, 2006; Heikkila *et al.*, 2011; Paavola *et al.*, 2009; Young, 2002; Young, 2006).

Fourth, institutional interplay can be *reciprocal* if it impacts the target institution while being attentive to its arrangements, or *unilateral* if it ignores them completely (Young, 2002). The Convention on the Conservation of Antarctic Marine Living Resources and the whaling regime exhibit institutional linkages that result in mutual impacts (Young, 1996). In contrast, the lack of recognition of fisher associations' role in fisheries management in India undermines their performance locally, in part because they have not been able to successfully influence centralized fisheries decision-makers (Berkes, 2006).

Lastly, institutional interplay can generate *positive*, *negative* (e.g., Young, 2002) or *neutral* effects in the target institution. The character of these effects depends on whether the interaction supports, contradicts or does not affect the target institution's objectives (Gehring & Oberthür, 2009). For example, the United Nations Fish Stocks Agreement has improved and supported compliance control in fisheries by bringing into the international arena important features of some more advanced regional fisheries regimes (Stokke, 2000), while the Kyoto Protocol's promotion of monocultures as carbon sinks contradicts the Convention on Biological Diversity's goal to protect biodiversity (Pontecorvo, 1999).

These forms of institutional interplay have been found mostly in international institutions. While there are yet no reasons to believe that such typologies are not applicable to interactions involving lower levels of social organization (Gehring & Oberthür, 2009), it is worth looking at interplay from the perspective of those same levels. Such interactions are less studied, and are essentially concerned with the effects that higher level institutions (national, sub-national, municipal) have on local ones through centralization of decision-making, nationalization of natural resources, or increased participation in markets (Berkes, 2002). These interactions tend to have negative effects on local institutions (Baticados & Agbayani, 2000), but other purposeful interactions can actually strengthen them (Berkes, 2002). Often, local institutions will seek recognition from the state (Marschke & Berkes, 2005), so that their legitimacy cannot be challenged. This recognition can be codified in a legal instrument, adding an extra layer of assurance by enabling the operation of community-based organizations (Pomeroy & Berkes, 1997). However, crystallizing norms and rules can backfire by reducing institutional capacity to adapt to changing conditions (Baines, 1989). Besides state recognition and enabling legislation, other cross-scale linkages that can be fostered to support local institutions include capacity building (Jones & Burgess, 2005) and institution building (Menezes *et al.*, 2009).

4. INSTITUTIONAL INTERPLAY IN MPA NETWORKS WITH COMMUNITY-BASED MPAs

MPA networks were identified through searches in grey (e.g., UNEP-WCMC 2008; World Bank 2006) and peer-reviewed literature (e.g., Game *et al.*, 2011). Additional searches for textual cues indicating that the MPA networks include community-based MPAs were conducted, leading to the identification of ten MPA networks formed at least

in part by community-based MPAs (Table 1). The literature search was then expanded to gather further evidence of institutional interplay, which is detailed in the following descriptions of the ten MPA networks.

Table 1 - MPA networks with community-based MPAs

Region	Location
Pacific Islands	New Zeeland
	Palau
	Kimbe Bay, Papua-New Guinea
	Choiseul Province, Solomon Islands
	Western Province, Solomon Islands
Southeast Asia	Danajon Bank, Philippines
	Southeast Cebu, Philippines
South America	Brazil
	Chile
	Ecuador

New Zealand currently has 33 no-take areas in its seas. They do not adequately represent the various ecosystems, and a national no-take MPA network is being planned. New Zealand's current MPA policy addresses the role of customary management tools (*taiäpure* and *mätaitai* reserves) in MPA networks (Bess & Rallapudi, 2007). These reserves cannot be proposed primarily for biodiversity conservation, though they can make a contribution to it and are seen as being compatible with the sustainable use of fisheries resources (Department of Conservation & Ministry of Fisheries, 2005). There is no clarification of the relation between customary fisheries management tools and overall MPA network management. However, the MPA Policy states clearly that customary reserves do not have veto power over proposed no-take MPAs. Nevertheless, its Implementation Guidelines suggest a prominent role for indigenous people in public consultation (Ministry of Fisheries & Department of Conservation, 2008). This and other inconsistencies, which may negatively affect customary reserves and the proposed MPA network, are to be streamlined through, among others, the implementation of the MPA network (Bess & Rallapudi, 2007).

The **Palau** MPA network is being created to implement the 2003 Protected Areas Network Act. The Act determines that Palau's national and 16 state governments are to collaborate in the creation of a national network of marine and terrestrial protected areas. A marine ecological gap assessment at the national level allowed planners to understand how existing MPAs are protecting the country's marine biodiversity, and what areas are

under protected (Corrigan *et al.*, 2007). Palau currently has twenty seven MPAs, and five Locally Managed Marine Areas (LMMA) that were established and legally recognized in the late 1990s (LMMA, 2010). An LMMA is "an area of nearshore waters and coastal resources that is largely or wholly managed at a local level" by local communities, often in collaboration with local government and other organizations (Govan *et al.*, 2008). Existing traditionally managed areas were limitedly accounted for in the protected area network scenarios produced with the software MARXAN (Hinchley *et al.*, 2007). As the analysis is scaled down to the state level, and state-specific targets and threats integrated, existing traditional managed areas will be mapped and taken into account (Hinchley *et al.*, 2007).

The MPA network planned for **Kimbe Bay, Papua-New Guinea** was designed to be resilient to climate change. In a first phase, broad Areas of Interest (AOI) were selected using the software MARXAN (Green *et al.*, 2009). In the future, local communities within each AOI are going to be involved to decide on the delimitation of individual MPAs in their AOI (Lipsett-Moore *et al.*, 2006). Though other governance types are planned for, inshore MPAs are to be established and managed as legally binding LMMAs (Green *et al.*, 2009). Individuals and organizations involved in LMMA management will join the LMMA network, a forum for sharing experiences and information that has played a prominent role in socio-economic monitoring in the Indo-Pacific region (Loper *et al.*, 2008). They have also seen their compliance and enforcement legitimacy strengthened by the approval by local governments of legislation that reinforces traditional authority (Green *et al.*, 2007). This legislation has already been used in several LMMAs.

In the **Choiseul Province of the Solomon Islands**, the provincial government was supported by The Nature Conservancy (TNC) in a province-wide conservation planning process targeting terrestrial and marine environments. A stakeholder workshop was held in May 2009, and community leaders engaged in participatory mapping resulting in the identification of 25 conservation features (Lipsett-Moore *et al.*, 2010). MARXAN was then used to systematically identify priority areas for conservation based on those community inputs as well as expert input, and on information on existing protected areas, LMMAs and marine managed areas (Lipsett-Moore *et al.*, 2010). All twelve wards of the province agreed to create one terrestrial protected area and one MPA within the next two years. MPA-making in Choiseul Province is likely to follow a strategy similar to past LMMA creation (LMMA, 2009). Previously, TNC had partnered with a local and

influential ecumenical NGO to provide assistance to communities in setting up a LMMA, assess community conditions, conduct a baseline survey, and provide advice to the community that then decided on how to proceed (Lipsett-Moore *et al.*, 2010). The MPA network is still being developed (Game *et al.*, 2011), and it is not clear if and how, in addition to participation in the LMMA network, community-based MPAs will articulate and coordinate MPA management with other institutions.

Also in the **Solomon Islands**, but this time in its **Western Province**, an MPA network was implemented in two lagoons for biodiversity conservation and fisheries enhancement (Aswani & Hamilton, 2004). Assisted by researchers, local communities have been able to use customary sea tenure (CST) regimes to create 23 MPAs where members have actively secured their entitlements (Aswani *et al.*, 2007). Each community-based MPA is governed by a Resource Management Committee (RMC) that is mandated to (i) ensure the MPA is secure and dispute-free; (ii) ensure enforcement and compliance; (iii) raise awareness; (iv) organize inter-MPA workshops for discussion of MPA-related issues; and (v) promote collaboration with outside institutions for exchange and educational programs (Aswani & Hamilton, 2004). RMCs and customary law are not always effective in dealing with poaching from outsiders and overfishing from locals (Cudney-Bueno & Basurto, 2009). RMCs are thus in the process of seeking legal support to protect marine resources under customary property (Aswani *et al.*, 2005). This will, hopefully, lead to legal recognition of RMCs and clarification of governmental and customary/RMC mandates. As well, it will allow RMCs to use a management order in provincial legislation for increased protection of marine resources in areas under customary management, and in this way, implement provincial legislation.

In the **Philippines**, the two MPA networks planned for Danajon Bank and Southeast Cebu are to be based on existing community-based MPAs that were not originally located to ensure connectivity. For this reason, new MPAs are to be created (Lowry *et al.*, 2009). In Danajon Bank, the MPA network is being developed as part of a project aimed at improving fisheries sustainability. Municipalities have formed a cluster linking them for planning and decision-making purposes, including the identification of appropriate sites for new MPAs (Armada *et al.*, 2009). Each MPA in the region is currently managed by an organization of local communities, and these organizations have formed an alliance to exchange experiences (Armada *et al.*, 2009). The alliance is being formalized so it can apply for external funding and technical support (Christie *et al.*, 2009). Part of their MPA

monitoring activities has been conducted with the participation of local resource users (Pietri *et al.*, 2009). In Southeast Cebu, the MPA network is based on existing municipal MPAs, new MPA planning, and collaboration between municipalities. Municipalities were primarily concerned with improving coastal law enforcement to stop commercial fishing in municipal waters, and signed a Memorandum of Agreement to create an inter-municipal, multi-stakeholder management council mandated to deal with marine affairs in their waters (Eisma-Osorio *et al.*, 2009). The council works as a marine issues information and decision-making hub for the municipalities, and has facilitated the formation of social networks among MPA managers (Eisma-Osorio *et al.*, 2009). The two MPA networks being created at Danajon Bank and Southeast Cebu are benefiting from cross-visits, a common practice in the Philippines whereby MPA managers visit another MPA to learn about their experiences and to empower host communities (Pietri *et al.*, 2009). Joint enforcement operations across municipal borders are also common, and have been facilitated by agreements and inter-municipal communication (Christie *et al.*, 2009). Community-based MPA management bodies are expected to improve their individual management and to be linked to other MPAs within the networks (Lowry *et al.*, 2009), though it is not clear how the latter will happen.

Brazil committed to have a national MPA network in place by 2012 for biodiversity conservation and fish stock recovery (Chatwin, 2007). The new network will include new and existing MPAs. By 2007, there were sixteen Marine Extractive Reserves (MERs) in the country – a type of community-based MPAs where the sustainable use of marine resources is allowed – and another 68 were awaiting approval (Diegues, 2008; Prates & Blanc, 2007). MERs are legally established after a request by local communities. They are managed by legally recognized user organizations (Diegues, 2008). MERs have brought important benefits to local populations: increased catches of target species have been reported (Prates & Blanc, 2007), and greater MER community pride follows requests from adjacent non-MER communities to be taught artisanal aquaculture techniques (Diegues, 2008). However, MERs also face problems, such as competition with other users for space; difficulties in excluding other users; reduced enforcement capacity; and, in some cases, difficulties in reaching the reserve due to privatization of access and use of the coastal strip (Di Ciommo, 2007; Diegues, 2008). In addition, MER-making efforts can easily be overridden by state agency permits for competing and environmental damaging activities (World Bank, 2006). It is not clear yet how the

management of current and future MERs will be integrated into MPA network management. However, it is very likely that IBAMA (Portuguese acronym for the Brazilian Institute for the Environment and Renewable Natural Resources) will have an important role in this, as it is responsible for supervising MERs, and is actively involved in the creation of the national MPA network.

Chile has committed to protect at least 10% of its territory through the creation of protected areas (CONAMA, 2005). Fifty-five (55) marine conservation priority sites have been identified, but existing MPAs were not taken into account (Chatwin, 2007). There are 22 MPAs in Chilean waters, and a system of 547 Management and Exploitation Areas for Benthic Resources (MEABRs) (World Bank, 2006). In these seabed areas, registered artisanal fishing groups have exclusive diving rights for shellfish collection, and exploit them according to a benthic resource management and exploitation plan (CONAMA, 2005). Following plan approval, MEABRs' activities are periodically reviewed by external consultants. This guarantees accountability but also imposes financial stress on MEABRs' users, who pay for the external review. Several MEABRs have had positive conservation effects, sometimes similar to those of no-take areas (Gelcich *et al.*, 2008a), and have improved environmental awareness among fishermen (Gelcich *et al.*, 2008b). MEABRs do not always exist as stand-alone marine management tools. Three recent government-run multiple use MPAs utilize MEABRs as part of their zoning scheme (World Bank, 2006). Chile's National Biodiversity Action Plan 2004-2015 endorsement of MEABRs as part of the "relevant public efforts developed in relation to biodiversity conservation and sustainable use" is supportive of the integration of MEABRs into a future MPA network (CONAMA, 2005; Fernandez & Castilla, 2005). However, it is not clear how MEABRs will be articulated with the wider MPA network.

Ecuador has a rather small MPA coverage: only 8 protected areas have a coastal or marine component, and these do not adequately protect the country's marine biodiversity (Chatwin, 2007; Ministerio del Ambiente del Ecuador, 2007). Ecuador's MPA network planning, which is part of the wider National System of Protected Areas (SNAP; Spanish acronym), included a marine gap assessment on about 80% of the mainland coast (Chatwin, 2007). Community-based protected areas are legally not part of SNAP, but this will change in the future (Ministerio del Ambiente del Ecuador, 2007). Protected areas governed by communities, indigenous people and afro-Ecuadorians will be one of SNAP's components (Ministerio del Ambiente del Ecuador, 2007). These protected areas

include mangrove areas that, since 1999 and independently of their property regime, can be used by communities through an "agreement of mangrove sustainable use and custody" (Ministerio del Ambiente del Ecuador, 2009). In these mangrove areas, all located outside protected areas, communities implement a management plan with enforcement entrusted to local authorities. Until August 2009, 29 such agreements had been produced by the Ministry of Environment (USAID, 2009). Mangrove areas under community management have had positive results, namely recovery of fish resources, increased income for local communities, ensured mangrove conservation, and allowed communities to consolidate the protection of their territory (Ministerio del Ambiente del Ecuador, 2009; USAID, 2009).

5. DISCUSSION

The previous section uncovered nine different forms of institutional interplay in MPA networks with community-based MPAs (Table 2). Most interactions are driven by strategic considerations, involve institutions at the same level (i.e., horizontal interplay), are reciprocated, and have (or are expected to have) a positive impact on MPA effectiveness. The impact of institutional interplay on MPA effectiveness was discerned by evaluating the contribution of institutional interplay to the stated goals of community-based MPAs and MPA networks, as described below. This general overview sets the stage for a more detailed discussion of the five distinctions regarding institutional interplay set out in section 3.

First, identification of the elements that define institutional interplay was limited by the fact that the MPA networks are still very recent, and consequently by the literature itself. The latter was thoroughly reviewed to identify all credible and non-conflicting evidence. Despite this, the confirmation of causal links between institutional interplay and MPA effectiveness was greatly restricted. To overcome such limitations, two degrees of influence were defined to reflect the strength of the relationship between institutional interplay and MPA effectiveness, i.e. potential and effective effects. For example, the LMMA network and inter-MPA workshops provide opportunities for MPA managers to share information and experiences. While this can easily be perceived as a positive experience for participants, it is not possible to know whether information acquired in this way was put into practice and actually led to positive changes in MPA effectiveness, that is, to the attainment of the goals of the MPAs. Consequently, inter-MPA workshops and

the LMMA network are considered to have only a potential effect on MPA effectiveness. In contrast, the fact that customary reserves and the future MPA network in New Zealand have overlapping jurisdictions with conflicting goals strongly suggests that the interplay between them, if not solved, will have negative consequences for both, as the resource exploitation goals of customary reserves can be overridden by the biodiversity conservation goals of the MPA network, and vice versa. This inference was derived from the available literature, and has also been hinted at by others (Bess & Rallapudi, 2007). Hence, the causal relationship between institutional interplay and MPA effectiveness was considered to have a negative impact on the goals of the customary reserves and the MPA network, that is, not just potential negative impact. Finally, there were also cases where institutional interplay was not identified in the literature (i.e., Palau; Choiseul Province, Solomon Islands; Chile) because there was no clear action on the part of the community-based MPAs (or of the MPA network) that contributed or conflicted with the goals of the MPA network (or of the community-based MPAs).

Second, functional linkages were mostly associated with vertical interactions. This is not surprising, as institutions at different levels on the jurisdictional scale will be functionally linked. Strategic linkages were all registered across the same level of social organization, and generally involved the sharing of information.

Third, vertical linkages identified were essentially concerned with issues of control and authority and driven by functional linkages. There were less occurrences of vertical interplay than of horizontal interplay. This could be due to the literature's greater focus on local dynamics than on cross-level interactions. Another explanation is that horizontal is more prevalent than vertical interplay: there are, indeed, more possibilities for interactions between multiple community-based MPAs than between community-based MPAs and a single MPA network management authority; in most cases such MPA network authorities appear to be absent. This lack of a centralized MPA network management authority may be explained by the fact that some MPA networks are building on existing linkages between community-based MPAs and other institutions associated with marine conservation and management, which may increase their likelihood of success (Waylen *et al.*, 2010). Thus, institutional interactions involving MPA networks with community-based MPAs are not limited to "internal" linkages (i.e., among community-based MPAs and between these and MPA network management), and can involve other institutions. For example, in northern Tanzania, district authorities were

directly involved in creating and managing collaborative management areas (Verheij *et al.*, 2004). However, relying on existing official institutions has its setbacks too, as collaboration with community-based marine conservation initiatives can be seen as being separate from their general duties (Wells *et al.*, 2010). Horizontal interplay, though assuming a multitude of forms, was not as varied as it initially seemed. Community-based MPAs are engaged in various activities with other community-based MPAs and other institutions at a similar level of organization. Yet, linkages between them are formed essentially by the sharing of information for mutual learning (e.g., cross-site visits), and by the pooling and coordination of individual resources for enforcement purposes. Information-dominated horizontal interplay reinforces the importance of social networks for MPA management. Such social networks facilitate the sharing of experiences that can lead to mutual learning, increasing the likelihood of MPA success, and are supportive of a socio-ecological conceptualization of MPA networks (Christie *et al.*, 2009; Lowry *et al.*, 2009). Cross-site visits, for example, while not having a direct positive impact on MPA success, have been found to be a good predictor of MPA compliance and enforcement if taken into consideration along with other educational activities (Pietri *et al.*, 2009). Cross-site visits are usually restricted to MPA managers. Extending cross-site visit participation to local communities could improve MPA performance in the long-term. Local communities that participate in cross-site visits have been found to increase their understanding of the challenges and opportunities facing MPA management, learn new MPA monitoring techniques, and refresh data analysis skills (LMMA, 2010). While the scope of horizontal interplay may be narrow, the variety of linkages registered reflects the various ways in which community-based MPAs may interact for their own benefit and for the benefit of their counterparts.

Fourth, most linkages were reciprocal, except for two horizontal interactions that were unidirectional. Though the distinction in terms of direction of institutional interplay is useful for a first exploration, it is not very informative. A more informed analysis of the nuances of reciprocal interplay (i.e., strength of interaction) would probably elicit its significance and mechanisms (King, 1997).

Fifth, the effects of institutional interplay were assessed in terms of its impact on MPA effectiveness, namely on its biophysical, socio-economic and governance aspects, and to the extent possible afforded by the available literature; hence, the classification of some effects as “potential” in Table 2. For example, inter-MPA workshops offer an

opportunity for MPA managers to share information and experiences, which can then be used to improve management of their MPA. The lack of strong evidence suggesting that this indeed happens has rendered the effect of inter-MPA workshops the classification of "potentially positive". In the case of legal recognition afforded to community-based MPAs, the effect of this institutional interplay was considered positive, given its obvious positive consequences for MPA effectiveness (i.e., legitimacy to enforce their own rules) even in the absence of reports after legal recognition was obtained. The effects of institutional interplay, though appearing overwhelmingly to be positive, only provide limited insights into the institutional dynamics of MPA networks with community-based MPAs. On the one hand, not all MPA networks have been implemented; as such, reported consequences of institutional interplay are only speculative. On the other hand, it is possible that negative and neutral consequences of interplay are not reported at all, especially as the latter can be easily dismissed as unimportant.

This examination of institutional interplay in MPA networks with community-based MPAs provides useful insights for the MPA literature and for the growing literature on the dynamics of environmental institutions. In particular, it has investigated two types of institutional interplay (i.e., vertical and horizontal) that are often addressed separately (Gehring & Oberthür, 2008), and that speak directly to the "middle ground" between top-down and bottom-up approaches suggested initially. This inquiry is limited in, at least, two aspects. First, a snapshot view of institutional interplay does not allow adequate understanding of institutional dynamics. For example, it is not possible to elaborate on how institutional linkages may change over time and through which mechanisms, and how this has affected MPA effectiveness. Second, while a broad analysis of a relatively large number of cases can be useful to gain a general view of institutional interplay in MPA networks with community-based MPAs, it misses important details that a more in-depth analysis would make clear. This last limitation is further compounded by the literature-based methodological approach. However, the ten cases of MPA networks with community-based MPAs that have been analysed offer fair material for more in-depth studies in the future.

Despite these limitations, the identification of different forms of institutional interplay has its value for MPA-making in the Western Indian Ocean. The fostering of positive institutional interplay complements the Western Indian Ocean MPA Toolkit (IUCN, 2004), which is silent on horizontal interplay, though it is supported by the opportunity

offered by the Western Indian Ocean Certification of MPA Professionals program to establish a social network of MPA professionals in the region. Others have also provided evidence of institutional interplay in fisheries co-management in Kenya and Madagascar (Cinner *et al.*, 2009) that could inspire similar MPA-related initiatives. The precise conditions under which any form of institutional interplay may be more easily implemented, or facilitate MPA success, were not investigated. However, MPA professionals in the Western Indian Ocean are better positioned to determine their applicability to their professional contexts, and to make any adjustments they may find appropriate. Even so, MPA professionals in the Western Indian Ocean and elsewhere are cautioned on the transaction costs associated with institutional interplay: interacting institutions need to spend time and money to foster linkages between them, exchange information, coordinate actions, and enforce compliance upon each other (McGinnis, 2005). These transaction costs may be particularly burdensome in developing contexts.

6. CONCLUSIONS

This paper set out to inform MPA-making in the Western Indian Ocean by examining the role institutional interplay may have in bridging top-down and bottom-up approaches to marine conservation, focusing on the particular case of MPA networks with community-based MPAs. Institutional interplay generally concerned information exchanges (e.g., through LMMA network, cross-visits) and issues of control and authority (e.g., overlapping jurisdictions, enforcement). Some forms of institutional interplay may have influence on MPA effectiveness, and can be an important tool for future MPA networks with community-based MPAs. However, fostering interactions among MPAs, and between them and other institutions, can be costly, and consequently purposeful interventions should be carefully considered.

The ten MPA networks with community-based MPAs identified here present an excellent opportunity for future in-depth research on the dynamics of institutional interplay and its influence on marine conservation success at the local and network level. As MPA coverage expands worldwide, we should expect more detailed accounts of the institutional dynamics involved in MPA-making processes.

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Table 2 - Forms of institutional interplay in MPA networks with community-based MPAs

	MPA networks	Identification criteria*	Drivers	Levels involved	Direction	Effects
Overlapping jurisdictions	New Zealand	MPA network affects customary reserves: conservation objectives may override customary fishing reserves	Functional linkage	Vertical	Reciprocal	Negative
LMMA network/inter-MPA workshops	Kimbe Bay, Papua-New Guinea; Western Prov., Solomon Islands	CB-MPAs affect other CB-MPAs: new information and lessons are used for CB-MPA management	Strategic linkage	Horizontal	Reciprocal	Potentially positive
Legal recognition	Kimbe Bay, Papua-New Guinea; Western Prov., Solomon Islands	Local/state authorities affect CB-MPAs: local/provincial legislation recognizes traditional/ customary authority	Functional linkage	Vertical	Reciprocal	Positive
Inter-MPA alliance	Danajon Bank, The Philippines	CB-MPAs affect other CB-MPAs: experiences are shared	Strategic linkage	Horizontal	Reciprocal	Potentially positive
Memorandum of Agreement & multi-municipal/stakeholder management council	Southeast Cebu, The Philippines	Municipalities and stakeholders affect others: coordination of enforcement efforts is facilitated	Strategic linkage	Horizontal	Reciprocal	Potentially positive
Cross-site visits	Danajon Bank and Southeast Cebu, The Philippines	CB-MPAs affect other CB-MPAs' biological and social success	Strategic linkage	Horizontal	Reciprocal	Positive
Joint enforcement operations	Danajon Bank and Southeast Cebu, The Philippines	CB-MPAs affect their and other CB-MPAs' enforcement effectiveness	Strategic linkage	Horizontal	Reciprocal	Positive
Sharing information	Brazil	MERs affect adjacent communities: transfer of traditional knowledge	Strategic linkage	Horizontal	Unilateral	Potentially positive
Enforcement by local authorities	Ecuador	Local authorities affect CB-MPAs: local authorities enforce CB-MPA's rules	Functional linkage	Vertical	Unilateral	Positive

*Source institution affects target institution: causal relationship.

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10.MARITIME BOUNDARIES AND TRANSBOUNDARY MPAs

GRILO, C. (2010). "The Impact of Maritime Boundaries on Cooperation in the Creation of Transboundary Marine Protected Areas: Insights from Three Cases", *Ocean Yearbook,* Vol. 24:115-150.

1. INTRODUCTION

Marine ecosystems are seriously threatened by human activities, such as coastal area development, waste discharge, and exploitation of marine resources.[1] The consequences of these threats are often transboundary in nature. They are being observed beyond the coastal or inland waters where they originate and affect neighbouring and distant states, and the high seas. Conversely, conservation measures applied by a state can also benefit the marine environment of its neighbours, and, thus, provide an incentive for transboundary cooperation in marine conservation.

The foregoing shows that there is an obvious interdependency among states in relation to their use of the seas and the impact this has on the marine environment. Cooperation between states is, therefore, a necessary condition for effective management of the marine environment and its resources. According to articles 192 and 197 of the 1982 United Nations Convention on the Law of the Sea (UNCLOS),[2] states must cooperate in several areas, including for the protection and preservation of the marine environment at the global and regional levels. The 1992 Convention on Biological Diversity (CBD),[3] in articles 8 and 22, advances this commitment by specifying the duty of state parties to conserve biodiversity through, among others, in situ conservation in a manner consistent with the law of the sea. The CBD Decision II/10: Conservation and Sustainable Use of Marine and Coastal Biological Diversity,[4] also known as the Jakarta Mandate, reinforces the obligation of state parties to implement measures to conserve

[1] GESAMP, *The State of the Marine Environment*, Reports and Studies No. 39 (Nairobi: UNEP, 1990); GESAMP, *A Sea of Troubles*, Reports and Studies No. 70 (Nairobi: UNEP, 2001).
[2] *United Nations Convention on the Law of the Sea*, 10 Dec. 1982, 1833 U.N.T.S. 3 (entered into force 16 Nov. 1994).
[3] *Convention on Biological Diversity*, 5 June 1992, 1760 U.N.T.S. 142 (entered into force 29 Dec. 1993).
[4] *Dec. II/10—Conservation and Sustainable Use of Marine and Coastal Biological Diversity*, Doc. UNEP/CBD/COP/2/19 (Jakarta: 2d Conference of the Parties, 1995).

marine biodiversity, particularly through the establishment of marine protected areas (MPAs).

MPAs are one of the most promising marine conservation tools.[5] By definition, they are areas of the marine environment that have been reserved for a conservation purpose.[6] As area-based management tools, MPAs can serve different objectives within and beyond that of their overall conservation goal. Besides protecting certain habitats and species, especially those that are critical to endangered populations, MPAs may also help rebuild depleted fish stocks, provide opportunities for tourism and marine research, and protect cultural heritage.[7] Unfortunately, the marine environment is far from being adequately protected by MPAs.[8]

The transboundary nature of marine ecosystems and resources necessitates the establishment of transboundary MPAs (TB-MPAs), whereby conservation measures are implemented in multiple jurisdictions and so that common threats to marine biodiversity may be jointly addressed. Ecosystem-based management thus challenges political borders by using ecological boundaries as a management area, instead of depending on administrative jurisdictions for that purpose. Like transboundary protected areas in general, the overlay of TB-MPAs with multiple jurisdictions is based on the assumption that sovereignty is not an impediment to cooperation in biodiversity conservation.[9] TB-MPAs have the potential to facilitate cooperation,[10] just as their establishment is itself a product of collaborative decision and action.

MPAs, transboundary or not, exist within the limits of the jurisdiction of coastal states inside specific ocean areas claimable under UNCLOS. In each of its declared maritime zones, a coastal state enjoys distinct jurisdictional rights that are progressively

[5] S. Belfiore, B. Cicin-Sain and C.N. Ehler, eds., *Incorporating Marine Protected Areas into Integrated Coastal and Ocean Management: Principles and Guidelines* (Gland, Switzerland: IUCN, 2004); G. Kelleher, ed., *Guidelines for Marine Protected Areas* (Gland: World Commission on Protected Areas, 1999).
[6] *Protection of the Coastal and Marine Environment*, IUCN Res. 17.38 (Gland: IUCN, 1988):2(b).
[7] Kelleher, see n. 5 above, at xvii.
[8] *Id.* at xxii (noting that 9 percent of the land is protected); L.J. Wood, L. Fish, J. Laughren and D. Pauly, "Assessing Progress towards Global Marine Protection Targets: Shortfalls in Information and Action," *Oryx* 42, no. 3 (2008): 340–351, at 340 (illustrating that only 0.65 percent of the marine environment is covered by MPAs).
[9] M. van Amerom, "National Sovereignty and Transboundary Protected Areas in Southern Africa," *GeoJournal* 58, No. 4 (2002): 265–273, at 269.
[10] T. Sandwith, C. Shine, L. Hamilton and D. Sheppard, *Transboundary Protected Areas for Peace and Co-operation* (Gland: IUCN, 2001): 7.

reduced from the maritime zone closer to land to the most seaward, that is, from internal waters, to the territorial sea, contiguous zone, exclusive economic zone (EEZ), and ending in the continental shelf. The geographical scope of these five maritime zones is a function of the creation of maritime boundaries that determine where they are measured from, their extension, and their width. Maritime boundaries are a key tool for coastal states to expand their sovereignty and jurisdiction over adjacent sea areas as permitted by UNCLOS.[11] Because TB-MPAs are dependent on how coastal states may exercise their jurisdiction over sea areas, the capacity of transboundary MPAs to go beyond sovereignty in addressing threats to marine biodiversity is linked to the role of maritime boundaries in determining the maritime space within which each state may claim rights over sea areas.

This article assesses the interaction between determination of sovereignty through maritime boundary-making and cooperation in marine conservation as materialized in transboundary MPAs. Its main goal is to analyze how maritime boundary-making has, or has not, affected cooperation between coastal states in creating TB-MPAs. In particular, it analyzes the boundary behaviour of coastal states and the functionality of potential or existing maritime boundaries associated with three transboundary marine protected areas established in different maritime boundary contexts: the Turtle Islands Heritage Protected Area in Malaysia and the Philippines; the Red Sea Marine Peace Park created by Israel and Jordan; and the Pelagos Sanctuary for Mediterranean Marine Mammals, promoted by France, Italy, and Monaco. This inquiry is timely because transboundary conservation is attracting growing attention[12] and many of the potential maritime boundaries are yet to be established.[13]

[11] The rules introduced by UNCLOS for boundary-making have allowed states to claim more sea space than permitted under pre-UNCLOS international law of the sea.

[12] One of the goals of the Programme of Work on Protected Areas of the Convention on Biological Diversity is "to establish and strengthen regional networks, transboundary protected areas (TBPAs) and collaboration between neighbouring protected areas across national boundaries," including in the marine environment; Dec. VII/28—Protected Areas (Articles 8(a) to (e), UNEP/CBD/COP/7/28 (Kuala Lumpur: 7th Conference of the Parties, 2004). Also, Article 35 of the 2004 draft of an International Covenant on Environment and Development states that parties to the convention would "cooperate in the conservation, management and restoration of natural resources which occur in areas under the jurisdiction of more than one State, or fully or partly in areas beyond the limits of national jurisdiction. To this end, (a) Parties sharing the same natural system shall make every effort to manage that system as a single ecological unit notwithstanding national boundaries"; IUCN Commission on Environmental Law, *Draft International Covenant on Environment and Development—Third Edition: Revised Version* (Gland: IUCN, 2004): 14.

[13] Despite its potential for extended jurisdiction over the marine realm, more than half of the world's maritime boundaries are yet to be settled; P. Hallwood, "An Economic Analysis of Drawing Lines in the Sea," *Ocean and Coastal Management* 51, no. 5 (2008): 405–409, at 405.

The article first describes the process of maritime boundary-making in relation to the maritime zones it may generate, how their distinct jurisdictional regimes relate to MPAs, and the factors influencing the creation of maritime boundaries. After introducing the concept of transboundary marine protected areas, it examines the parallel history of the three transboundary MPAs in the context of existing maritime boundaries, or the potential they carry to influence the determination and delimitation of new boundaries in the areas under consideration. The interactions between maritime boundary-making and cooperation in creating and managing TB-MPAs are discussed with reference to the factors perceived to influence both processes. The article concludes with an argument on the assumed need for maritime boundary-making to precede the creation and management of transboundary marine protected areas.

2. MARITIME BOUNDARIES, MARITIME ZONES, AND MARINE PROTECTED AREAS

In general, boundaries allocate rights and duties over specific land or sea areas. In the particular case of maritime boundaries, this allocative purpose is complemented by zone-making. According to Johnston, under UNCLOS, and in addition to delimiting jurisdictional zones, boundaries also serve an administrative purpose insofar as they provide the geographical scope to which specific regulatory arrangements apply.[14]

This section sets out the three phases according to which the process of boundary-making unfolds: first, the delineation of baselines from where the breadth of the maritime zones is measured; second, the determination of the seaward limits of those maritime zones; and third, the delimitation of the "lateral" boundaries, that is, boundaries between adjoining or opposite coastal states.[15] The maritime zones generated in each of them are described and discussed in relation to MPA-making.[16] The section ends with an examination of the factors at play in maritime boundary-making.

2.1 Delineation of Baselines

[14] D.M. Johnston, *The Theory and History of Ocean Boundary-Making* (Kingston: McGill-Queen's University Press, 1988): 7.
[15] *Id.* At 123, n. 1.
[16] The maritime zones beyond national jurisdiction are discussed later in this section.

The process of maritime boundary-making, and therefore maritime zone-making, is initiated by the delineation of baselines. The landward portion of the sea defined by the baseline constitutes internal waters (UNCLOS, Article 8(1)). The coastal state exercises full sovereignty in its internal waters and only in very particular cases may foreign vessels exercise the right of innocent passage within that area (UNCLOS, Article 8 (2)). Consequently, the coastal state is free to create and manage MPAs in its internal waters without being limited by the rights of other states. In the case of archipelagic states, the baselines are delineated around the outward side of the outer islands (UNCLOS, Article 47). In the waters on the inward side of the archipelagic baselines, the archipelagic state enjoys sovereignty over the water column, airspace, seabed, subsoil, and all marine resources (UNCLOS, Article 49).[17] Paradoxically, foreign vessels and aircrafts enjoy more rights in these archipelagic waters than in the territorial sea of the archipelagic state, located on the outward side of the archipelagic baselines.[18]

2.2 Determination of Seaward Limits

After baseline delineation, and in addition to internal waters, four other maritime zones may be created through the determination of seaward limits in relation to the baselines.

First, a coastal state may establish its territorial sea by claiming an area adjacent to land where it may enjoy sovereignty—in similar terms as that enjoyed in its land territory—up to 12 nautical miles (NM) from the baselines (UNCLOS, Articles 2 and 3). The coastal state's sovereignty in the territorial sea is, however, limited by the right of innocent passage of foreign vessels (UNCLOS, Article 17). This implies that the establishment and management of MPAs in the territorial sea shall not, in any way, interfere with their right of innocent passage.[19]

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[17] Archipelagic baselines, as opposed to baselines delineated by non-archipelagic states, do not generate internal waters on their inward side. Article 50 of UNCLOS determines that "[w]ithin its archipelagic waters, the archipelagic State may draw closing lines for the delimitation of internal waters."

[18] R.L. Bledsoe and B.A. Boczek, *The International Law Dictionary* (Santa Barbara: ABC-CLIO, 1987), *s.v.* archipelagic waters.

[19] Most MPAs are located within the territorial seas and appear not to conflict with the right to innocent passage. Some coastal states, like Belgium, have legislated in this regard. Article 20(2) of its 1999 Act on Protection of the Marine Environment and Ocean Space under Belgium jurisdiction reads as follows: "Establishment of marine protected areas in the territorial sea may not have the effect of preventing or restricting the exercise of the right of innocent passage of foreign vessels in the territorial sea." Act of 19 January 1999 on Protection of the Marine Environment and Ocean Space under Belgium Jurisdiction, reprinted in *Law of the Sea Bulletin* 45 (2001): 47–66.

Second, a coastal state may also claim a contiguous zone in the area immediately adjacent to the territorial sea. In this zone, which cannot extend more than 24 NM from the baselines, "the coastal State may exercise the control necessary to: (a) prevent infringement of its customs, fiscal, immigration or sanitary laws and regulations within its territory or territorial sea; (b) punish infringement of the above laws and regulations committed within its territory or territorial sea" (Article 33 (1) of UNCLOS). In the case where an EEZ overlapping with the contiguous zone has not been claimed, the coastal state is very restricted in its legal capacity to both implement an MPA and enforce its regulations. The contiguous zone has seen its importance reduced since the adoption of UNCLOS and the introduction of the legal regime of the EEZ.[20] Even though many coastal states still declare a contiguous zone and claim an EEZ, the EEZ regime is significantly more relevant to the creation of MPAs, as it will be shown next.

Third, and within an extension of 200 NM from the baselines, a coastal state can claim its EEZ, beginning from the seaward limit of the territorial sea (UNCLOS, Article 55). The particular legal regime of the EEZ, one of the major contributions of the Law of the Sea Convention to the governance of the oceans, attempts to balance the sovereign rights and jurisdiction of the coastal state with "the freedoms [of other states] referred to in article 87 of navigation and overflight and of the laying of submarine cables and pipelines, and other internationally lawful uses of the sea related to these freedoms, such as those associated with the operation of ships, aircraft and submarine cables and pipelines" (UNCLOS, Article 58 (1)). For the purpose of MPA-making, a distinction is necessary. On the one hand, the coastal state has in its EEZ "*sovereign rights* for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds" (UNCLOS, Article 56 (1) (a)).[21] On the other hand, it has *jurisdiction* for "(i) the establishment and use of artificial islands, installations and structures; (ii) marine

[20] V. Prescott and C. Schofield, *The Maritime Political Boundaries of the World*, 2d ed. (Leiden: Martinus Nijhoff, 2005): 19. For a recent discussion of the role of the contiguous zone in the protection of underwater cultural heritage, see P. Sioussiouras, "The Contiguous Zone as a Mechanism for Protecting the Underwater Cultural Heritage," in *Unresolved Issues and New Challenges to the Law of the Sea, Time Before and Time After* (A. Strati, M. Gavouneli and N. Skourtos eds., Leiden: Martinus Nijhoff, 2005): 63.
[21] Emphasis added.

scientific research; (iii) [and] the protection and preservation of the marine environment" (UNCLOS, Article 56(1)(b)).[22] This implies that whether a coastal state may create and enforce the regulations of an MPA in the EEZ will depend on its main purpose. An MPA created to enhance fish stocks falls under the coastal state's sovereign rights to conserve its marine resources in the EEZ, while an MPA established to protect particular habitats and species falls only under its jurisdiction. Where sovereignty is not applicable, MPAs for marine conservation are limited by the rights other states enjoy in the EEZ of the MPA-making coastal state. However, because most MPAs usually have a mix of objectives that most often include both biodiversity conservation and fisheries enhancement,[23] the creation of MPAs in the EEZ will hardly contradict the purposes of the EEZ regime,[24] and even less the general obligation of all states "to protect and preserve the marine environment" (UNCLOS, Article 192).[25]

Finally, a coastal state has a juridical continental shelf "extend[ing] beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance" (UNCLOS, Article 76).[26] A coastal state has sovereign rights over the continental shelf for the purpose of exploring and exploiting its natural resources, namely "mineral and other non-living resources of the seabed and subsoil together with living organisms belonging to sedentary species" (UNCLOS, Article 77(4)). The creation of benthic MPAs, that is, conservation areas

[22] For a discussion of the different implications of sovereign rights and jurisdiction of the coastal state over the EEZ for the purpose of creating MPAs, see F.H. Wegelein, "Marine Protected Areas in the Exclusive Economic Zone: The European Union between a Rock and Hard Place?" *Georgian Law Review* 5, no. 2–3 (2002): 321–371, at 335–345.

[23] D.P. Boersma and J.K. Parrish, "Limiting Abuse: Marine Protected Areas, A Limited Solution," *Ecological Economics* 31, no. 2 (1999): 287–304, 287; P.J.S. Jones, "A Review and Analysis of the Objectives of Marine Nature Reserves," *Ocean and Coastal Management* 24, no. 3 (1994): 149–178, at 149.

[24] In 1999, only 15 MPAs were known to have been created in the EEZ; Kelleher, see n. 5 above, at 8. Some coastal states, like Mexico and Australia, have already created MPAs in their EEZs, and others (e.g., US and South Africa) are planning to do the same; UNEP-WCMC, *National and Regional Networks of Marine Protected Areas: A Review of Progress* (Cambridge: UNEP-WCMC, 2008): 49–50, 62, 84.

[25] Wegelein, see n. 22 above, at 347.

[26] A coastal state does not need to declare its continental shelf up to 200 NM to enjoy its rights as provided in UNCLOS. If the coastal state intends to claim the continental shelf beyond the 200 NM, it is to submit a proposal of its limits to the Commission on the Limits of the Continental Shelf, whose recommendations on the delineation are final (UNCLOS art. 76).

limited to the sea bottom, is therefore restricted to the regulation of their exploitation.[27] Though MPAs in the continental shelf may protect seamounts[28] wherever they fall inside this maritime zone of any given coastal state, it is not yet clear the extent of the coastal state's rights to MPA-making and management *vis-à-vis* the freedom of fishing enjoyed by other states in the overlaying waters.[29]

2.3 Maritime Zones beyond National Jurisdiction

Besides these five maritime zones—internal waters, territorial sea, contiguous zone, exclusive economic zone, and continental shelf—two other maritime zones are found in the sea: the Area and the high seas. Unlike the former zones, they do not fall under the jurisdiction of coastal states, but instead, under that of the International Seabed Authority (ISA) and of flag states, respectively. However, the claims of coastal states to extended jurisdiction over their adjacent maritime space impact on the size and shape of both the Area and the high seas.

The high seas are constituted by "all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a State, or in the archipelagic waters of an archipelagic State" (UNCLOS, Article 86). Sixty-four percent of the marine environment is estimated to be high seas.[30] As in the EEZ, the potential creation of MPAs in the high seas needs to be examined against the freedom of the high seas. The latter comprises, among others, the freedom of navigation, overflight, fishing, the freedom to conduct scientific research, to construct artificial islands and other

[27] J. Gibson and L. Warren, "Legislative Requirements" in *Marine Protected Areas: Principles and Techniques for Management*, S. Gubbay (ed.), (London: Chapman and Hall, 1995): 37.

[28] Seamounts are underwater mountains that do not reach the surface. They are areas of high biodiversity, hosting endemic communities not found elsewhere. Seamounts concentrate many fish assemblages, making them particularly attractive for fisheries activities. Because most of the sessile species found in seamounts grow extremely slowly, these ecosystems are vulnerable to bottom fishing activities; T. Morato and D. Pauly, eds., *Seamounts: Biodiversity and Fisheries* (Vancouver: Fisheries Centre Research, University of British Colombia, 2004), available online: <http://www.seaaroundus.org/report/seamounts/FCRR12(5).pdf>.

[29] Executive Secretary of the Convention on Biological Diversity, *Management of Risks to the Biodiversity of Seamounts and Cold Water Coral Communities Beyond National Jurisdiction* (2003) UNEP/CBD/COP/7/INF/25, Conference of the Parties to the Convention on Biological Diversity, available online: <http://www.cbd.int/doc/meetings/cop/cop-07/information/cop-07-inf-25-en.doc>.

[30] Executive Secretary of the Convention on Biological Diversity, *Scientific Information on Biodiversity in Marine Areas Beyond the Limits of National Jurisdiction*, UNEP/CBD/WG-PA/1/INF/1, Ad Hoc Open-Ended Working Group on Protected Areas, (2005) available online: <http://www.cbd.int/doc/meetings/pa/pawg-01/information/pawg-01-inf-01-en.pdf>.

installations, and to lay submarine cables and pipelines (UNCLOS, Article 87(1)).[31] In exercising the freedom of the high seas, flag states are to comply with measures for the exploitation of marine resources (UNCLOS, Articles 116 to 119) and for the conservation of marine mammals (UNCLOS, Article 120). In regards to conservation of marine biodiversity, beyond these provisions, in the high seas flag states are only obliged by the general duty to protect the marine environment, as set out in article 192. Therefore, the potential for MPA establishment in the high seas is limited by the type of feature targeted for conservation. If the goal of a high seas MPA falls outside the limits imposed by UNCLOS, its success will depend on the willingness and capacity of flag states to regulate and enforce the actions of the vessels flying their flag.[32]

The Area, declared the common heritage of mankind in 1970, comprises the seabed and its subsoil beyond national jurisdiction.[33] Its size and shape is determined by the seaward limit of the continental shelf.[34] Because the mandate of the ISA is limited to the regulation of the exploitation of the mineral resources of the Area, marine conservation measures would have to be considered by the ISA in light of the benefits they may afford to its mineral resources.[35]

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[31] The freedom of the high seas is subject to the relevant provisions of the Law of the Sea Convention, namely those pertaining to the Area and in regard to marine scientific research.

[32] K.M. Gjerde and G. Kelleher, "High Seas Marine Protected Areas on the Horizon: Legal Framework and Recent Progress," *Parks* 15, no. 3 (2005): 11–18, at 12. For recent developments on high seas MPAs, see J. Ardron, K. Gjerde, S. Pullen and V. Tilot, "Marine Spatial Planning in the High Seas," *Marine Policy* 32, no. 5 (2008): 832–839; T. Scovazzi, "Marine Protected Areas on the High Seas: Some Legal and Policy Considerations," *International Journal of Marine and Coastal Law* 19, no. 1 (2004): 1–17; IUCN, *Ten-Year High Seas Marine Protected Area Strategy: A Ten-Year Strategy to Promote the Development of a Global Representative System of High Seas Marine Protected Area Networks (Summary Version), as Agreed by Marine Theme Participants at the Vth IUCN World Parks Congress, Durban, South Africa (8–17 September 2003)* (Gland, Switzerland: IUCN, 2004).

[33] *Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof beyond the Limits of National Jurisdiction*, GA Res. 2749(XXV), UN GAOR 25d Sess., UN Doc. A/RES/25/2749 (1970). For a short history of the concept, see B. Vukas, *The Law of the Sea, Selected Writings* (Leiden: Martinus Nijhoff Publishers, 2004), c. 9.

[34] The legal continental shelf may extend beyond the reach of a coastal state's EEZ. Consequently, in some regions of the high seas where jurisdiction is exercised by flag states, an overlap will occur with the legal continental shelf. When no continental shelf has been claimed beyond the 200 NM, its seaward limit may coincide with that of the EEZ, and both may form a "single all-purpose" maritime boundary; S. Rosenne, "Geography in International Maritime Boundary-Making," *Political Geography* 15, no. 3–4 (1996): 319–334, at 329.

[35] Gjerde and Kelleher, see n. 32 above, at 16. Marine experts are currently working with the International Seabed Authority to close some areas of the Area to seabed mining, as a measure to protect deep seabed biological communities; K.M. Gjerde and C. Breide, eds., *Towards a Strategy for High Seas Marine Protected Area, Proceedings of the IUCN, WCPA and WWF Experts Workshop on High Seas Marine Protected Areas 15–17 January 2003, Malaga, Spain* (Gland, Switzerland: IUCN, 2003): 28, n. 19.

In sum, when considering the creation of MPAs, coastal states need to consider their distinct rights and those of other states according to the type of maritime zone. MPAs can be established in the internal waters and the territorial sea of a coastal state without restrictions, except for the legitimate exercise of the right of innocent passage by foreign states. In the contiguous zone and the EEZ, the mix of objectives of an MPA will need to, at least partially, match the applicable sovereign rights and jurisdiction of the coastal state, with due regard for the rights of third states. In the high seas and the Area, the establishment and management of any MPA is subjected, respectively, to the willingness of flag states to ensure their vessels' compliance with regulatory measures, and the right of the ISA to implement measures regulating mineral exploitation.

Against this background, the discussion now considers how the determination of "lateral" boundaries *vis-à-vis* these various ocean areas may affect the prospect for the establishment of TB-MPAs. The discussion focuses mainly on how the factors that influence the possibility of efforts to delimit these boundaries may result in their concrete settlement, or in agreement on a boundary arrangement, or on neither.

2.4 Determination of "Lateral" Limits

After delineation of baselines and determination of seaward limits, the final stage of maritime boundary-making consists in determining the "lateral" limits of maritime zones, to shape their width in relation to adjacent coastal states, and their extension in relation to opposite states with overlapping claims. A coastal state may delimit its lateral boundaries with adjoining or opposing coastal states in respect of the maritime zones both have claimed.

In the case of the territorial sea, and where states fail to agree on such a boundary, a coastal state cannot "extend its territorial sea beyond the median line every point of which is equidistant from the nearest points on the baselines from which the breadth of the territorial seas of each of the two States is measured" (UNCLOS, Article 15). UNCLOS does not set out the rules for the delimitation of the contiguous zone between two adjacent or opposing states.[36] As for the EEZ, the guidance provided by UNCLOS has been appropriately termed as vague and empty.[37] It ascertains that the boundary

[36] For an explanation of this omission, see Vukas, n. 33 above, at 87–95.
[37] *Id.* at 86.

agreement must be an "equitable solution" (Article 74 (1)), but it does not specify the rules through which such a solution is to be found. Importantly enough, UNCLOS imposes negotiation as the primary means to settle the EEZ bilateral boundary, suggesting in addition that states enter into provisional arrangements regarding the putative border region while an agreement on the maritime boundary is not reached (Article 74 (3)). If, within a reasonable period, the diplomatic option fails, states are then to resort to the dispute settlement mechanisms provided by UNCLOS (Article 74 (2)). These provisions are similar to those applicable to the delimitation of the continental shelf between adjoining and opposing coastal states (UNCLOS, Article 83), but in sharp contrast with those on the territorial sea, which lack orientation on the process for delimiting a shared boundary between two coastal states.

2.5 Implications of Maritime Boundary-Making for Transboundary MPAs

The framework provided by UNCLOS for maritime boundary-making is far from being comprehensive. One of its weaknesses is its insufficient emphasis on the connection between a boundary settlement and cooperative transboundary arrangements for coordinated exploitation of the areas delimited.[38] Boundary settlements and arrangements are distinguished by the certainty and clarity of the former, as opposed to the flexibility of the latter.[39] Boundary settlements resolve a boundary issue permanently, while a transboundary arrangement serves the wider goal of facilitating cooperation or consultation in the development and management of sea areas around a maritime boundary.

As far as the limits of the EEZ are concerned, transboundary arrangements may constitute a provisional step, pending the negotiation of the boundary (UNCLOS, Article 74 (3)), or the resolution of a dispute associated with its delimitation, as provided by Part XV of UNCLOS. One of these arrangements is the establishment of a Joint Development Zone (JDZ).[40] A JDZ is "a provisional arrangement covering the whole or part of the overlapping claimed areas, with or without the settlement of a maritime boundary."[41]

[38] D.M. Johnston and P.M. Saunders, eds., *Ocean Boundary Making: Regional Issues and Developments* (London: Croom Helm, 1988): 7.
[39] *Id.* at 329–330.
[40] S.P. Jagota, "Maritime Boundary and Joint Development Zones: Emerging Trends," *Ocean Yearbook* 10 (1993): 110–131 at 110.
[41] *Id.* at 112.

JDZs are apparently used exclusively for the joint exploitation of marine resources, easing divergences on often the most contentious issue in maritime boundary delimitation: the perceived economic benefits marine resources may offer.[42]

JDZs are of particular importance in the context of enclosed or semi-enclosed seas, where states should cooperate in, *inter alia*, the protection of the marine environment (UNCLOS, Article 123 (b)).

In the context of existing maritime boundaries, the creation of TB-MPAs may be facilitated by the absence of disputes over the boundaries and the resources they divide. Maritime boundaries have the advantage of distributing sea areas and determining jurisdictions. The clarity and certainty provided allows states engaged in transboundary marine conservation to focus on deciding what measures to apply, and how to apply and enforce them within the framework afforded by the maritime zones and respective boundaries. Additionally, TB-MPAs may provide an entry point for transboundary arrangements of another nature than that of marine conservation.[43]

States may not always be interested in negotiating or resolving disputes, however, over a maritime boundary, usually because the costs entailed supplant the benefits they may gain from resource exploitation. Here, then, TB-MPAs may have a role to play. Because maritime boundary disputes are often a result of divergences over the distribution of valuable marine resources, TB-MPAs may embody a provisional boundary arrangement until the boundary is definitely settled. Hypothetically, and to a limited extent, the success of a TB-MPA where a maritime boundary is absent may be measured by the common understanding among the coastal states that the TB-MPA suffices as a boundary arrangement.

In extreme cases where the absence of maritime boundary settlements may impact seriously on the economic activities of one of the states in the border region,[44] and even though marine conservation may be a peripheral issue between contending states, the prospect of a TB-MPA may not gather the necessary level of cooperation its materialization may require.

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[42] D. Dzidzornu and S.B. Kaye, "Conflicts over Maritime Borders: The 1982 United Nations Law of the Sea Convention Provisions and Peaceful Settlement," *Ocean Yearbook* 16 (2002): 541–607, at 542.
[43] M.J. Valencia, "Sea of Japan: Transnational Marine Resource Issues and Possible Cooperative Responses," *Marine Policy* 14, no. 6 (1990): 507–525, at 521.
[44] *Id.* at 512.

Whether a TB-MPA succeeds in any of the hypothesized situations is dependent on the interplay between the multiple factors associated with the making of the maritime boundary in issue.

2.6 Factors Influencing Maritime Boundary-Making

As mentioned before, maritime boundary-making is expected to offer certainty to the states involved in the development and management of sea areas by creating maritime zones and allocating marine resources.[45] When ocean boundaries are delimited, competition between coastal states is reduced and the potential for conflict over border resources is minimized.[46] Maritime boundary-making has, therefore, the potential to facilitate cooperation between states in, for example, environmental protection.[47]

Though it is guided by law, maritime boundary-making is not a mere legal exercise. Besides legal principles, rules codified in UNCLOS, state practice, and court cases, other factors contribute to the process, particularly in a "lateral" context.[48]

Physical characteristics of the coastline and seabed influence the determination of baselines and, therefore, the seaward limits of every claimable jurisdictional zone. One illustrative case is that of semi-enclosed seas, where more often than not, maritime boundary-making will be a bilateral exercise, given the likelihood of overlapping claims to the maritime zones. The geological and geomorphological characteristics of the seabed are also crucial in settling maritime boundaries dividing overlapping claims to the continental shelf.[49]

An affable *political relationship* between coastal states with overlapping claims is also influential in determining how the maritime boundary-making process may unfold. States that have less than polite relationships may have more difficulty in solving a dispute over sea areas, even if the issue at stake is not closely related to maritime boundary-making. Where coastal states are in, at least, amicable terms, and if more pervasive factors do not come into play, the delimitation of a common maritime boundary may be less contentious.

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[45] Dzidzornu and Kaye, see n. 42 above, at 543–544.
[46] *Id.* at 547.
[47] A.L. Springer, "Do Good Fences Make Good Neighbours? The Gulf of Maine Revisited," *International Environmental Affairs* 6, no. 3 (1994): 223–244, at 234–237.
[48] Johnston, see n. 14 above, c. 14.
[49] See UNCLOS art. 76.

Socio-cultural similarity between adjoining and opposing coastal states may also facilitate dialogue and cooperation in settling maritime boundaries. Confluent values and beliefs may lay the ground to advance common understanding on the boundary-related issues under consideration.[50]

The same does not happen when *economic interests* clash. Economic benefits usually originate boundary disputes and drive territorial behavior regarding the sea areas where marine resources are perceived to be abundant.[51] States are generally concerned about two particular economic aspects of maritime boundary-making: the rents they can derive from the resources that may be allocated and the costs of engaging in a dispute over a maritime boundary.[52] The absence of resolution of so many maritime boundaries may be explained by the high rents the involved states expect from marine resources in comparison to relatively lower costs of staking positions in a dispute.[53]

Disputes over a maritime boundary may, eventually, only be settled through the *intervention of third parties*. That was the case of the disagreement between Argentina and Chile over the Beagle Channel, where the Pope mediated the negotiations between the two states, resulting in the 1984 treaty establishing a maritime boundary between them.[54] However, third party intervention may not always be successful in resolving a maritime boundary dispute. For example, Guyana and Venezuela have still not come to terms regarding their maritime boundary, despite the intervention of the Secretary-General of the United Nations.[55]

[50] On a similar note, the views of the participants in a negotiation process have also a bearing in its outcome; E. Raftopoulos, "International Environmental Negotiation as a Governance Technique" in *Contributions to International Environmental Negotiation in the Mediterranean Context*, eds. E. Raftopoulos and M. McConnell (Athens: Ant. N. Sakkoulas, 2004).

[51] More recently, environmental concerns and security reasons seem to be guiding the behavior of states toward their delimited maritime boundaries; J.L. Suárez de Vivero and J.C. Rodriguez Mateos, "New Factors in Ocean Governance: From Economic to Security-Based Boundaries," *Marine Policy* 28, no. 2 (2004): 185–188.

[52] Hallwood, see n. 13 above, at 407.

[53] *Id.*

[54] S.P. Jagota, *Maritime Boundary* (Dordrecht, The Netherlands: Martinus Nijhoff, 1985), at 325.

[55] P.A. Hoyle, "The Guyana-Suriname Maritime Boundary Dispute and Its Regional Context," *IBRU Boundary and Security Bulletin* 9, no. 2 (2002): 99–107, at 106–107. More recently, no advances seem to have been made in this regard, given Venezuela's insistence on a claim to a substantial portion of Guyana's land territory, precluding the negotiation of the associated maritime boundary.

Taking the foregoing factors into consideration, the three transboundary MPAs of this article are now assessed in terms of the *boundary behavior*[56] of the coastal states involved, and the *functionality*[57] of the maritime boundaries straddled by each TB-MPA. It is expected that boundary behavior and the functionality of the related maritime boundaries have an impact on how transboundary MPAs are created and managed.

3. TRANSBOUNDARY MARINE PROTECTED AREAS

Transboundary protected areas (TBPAs) have received much attention in recent years, creating expectations about the integration of conservation, development and peace-building goals, and the scaling-up of conservation to wider management units. The main theme of the 2003 World Parks Congress—Benefits Beyond Boundaries—reflects this paradigm. It had its beginning in 1932 with the establishment of the Waterton-Glacier International Peace Park between the United States and Canada.[58] Clearly, transboundary protected areas are not new. Still, it was not until 2001 that a definition was first proposed for this marine management and resources conservation concept. A transboundary protected area is:

> *An area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means.*[59]

Transboundary cooperation in the marine environment is not as common as on land,[60] just like the coverage of the sea by protected areas is less than that found in

[56] Boundary behavior is "any form of [. . .] action designed to affect boundary-related activities and issues"; Johnston and Saunders, see n. 38 above, at 228, n. 8.
[57] A maritime boundary is functional "if it facilitates the tasks of co-operative or consultative ocean development and management in adjacent waters." Johnston and Saunders, see n. 38 above, at 332.
[58] T. Sandwith and C. Besançon, "Trade-offs among multiple goals for transboundary conservation," (2003) Woodrow Wilson International Center for Scholars, available online: <http://www.wilsoncenter.org/events/docs/Besancon_Sandwith.pdf>.
[59] Sandwith *et al.*, see n. 10 above, at 3.
[60] D.C. Zbicz, "Transfrontier Ecosystems and Internationally Adjoining Protected Areas" (Cambridge and Gland: UNEP-WCMC and WCPA, 1999), available online: <http://www.unep-wcmc.org/protected_areas/transboundary/adjoining.pdf>.

terrestrial ecosystems.[61] The scarcity of examples of TB-MPAs is further attested to in the lack of literature and recent experience on its existence and administration.[62]

Like maritime boundary-making in a bilateral context, the establishment and management of TB-MPAs is dependent on the level of cooperation between concerned coastal states regarding marine conservation. It is likely that other transboundary issues may also affect the development of transboundary MPAs.

It is appropriate at this point to clarify what cooperation in the protection of the marine environment is understood to be under the UNCLOS. Part XII on the protection and preservation of the marine environment provides that "States shall cooperate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this Convention, for the protection and preservation of the marine environment, taking into account characteristic regional features" (UNCLOS, Article 197). Three possible forms of cooperation between states in the protection of the marine environment are recognized: sharing of information, prevention of pollution, and adoption of regulations on prevention, reduction, and control of marine pollution.[63] Information sharing is required in regard to imminent or actual damage (UNCLOS, Article 198) and of research programs on marine pollution (UNCLOS, Article 200). Cooperation in the prevention of pollution can be achieved by jointly developing contingency plans (UNCLOS, Article 199) and by establishing scientific criteria for the appropriate regulations to prevent, reduce, and control marine pollution (UNCLOS, Article 201). Finally, states are expected to participate in the activities of the competent international organizations in establishing the above mentioned regulations.

[61] Wood *et al.*, see n. 8 above.

[62] Besides the three cases here presented, other examples of transboundary conservation initiatives with distinct levels of formality are the Mesoamerican Barrier Reef System (Belize, Guatemala, Honduras, and Mexico), the Eastern Tropical Pacific Seascape (Colombia, Costa Rica, Ecuador, and Panama), and the Wadden Sea (Denmark, Germany, and the Netherlands). In 2007, the number of MPAs created outside the territorial waters of European coastal states was still rather small, precluding their linking into a transboundary MPA; C. Neumann, *The Legal Basis for Managing Transboundary Marine Protected Areas: Overview of Existing European and International Legal and Policy Frameworks for the Management of Transboundary Marine Protected Areas* (Frankfurt: WWF Germany, 2007), at 14.

[63] G. Tsaltas, "Towards a World Protection Framework of the Marine Environment through the Promotion of International and Regional Cooperation under the UN Convention on the Law of the Sea" in Strati *et al.*, n. 20 above, at 78–82.

Cooperation will, therefore, be a distinctive descriptive element of the three transboundary MPAs chosen to elicit the interaction between transboundary MPAs and maritime boundaries in this article. The Turtle Islands Heritage Protected Area (TIHPA), the Red Sea Marine Peace Park (RSMPP), and the Pelagos Sanctuary for Mediterranean Marine Mammals (PSMMM), bring two elements of diversity to the analysis. First, the concurrent evolution of the TB-MPAs and of the maritime boundaries at issue between the states involved is distinct in each example. Second, the three TB-MPAs were established with different purposes, and, often, as the result of processes not always steered by the states themselves. In addition to the diversity of situations depicted by the three cases, the choice of these particular cases was also motivated by the fact that the number of states involved is limited.

For each TB-MPA, background information is provided on the emergence of the marine conservation arrangements, including the motivation for engaging in cooperation. The maritime boundaries straddled by each TB-MPA are identified in relation to the maritime zones they generate. By eliciting the parallel evolution of marine conservation cooperation and maritime boundary delimitation (when applicable), the role of existing or potential maritime boundaries in the history of the TB-MPA is examined in the light of identified boundary behavior and perceived functionality.

3.1 Turtle Islands Heritage Protected Area

3.1.1 Origin and History

Covering an area of 2,446 km^2, the Turtle Islands Heritage Protected Area (TIHPA) is the first transboundary marine protected area in the world dedicated exclusively to the conservation of sea turtles,[64] protecting 80 percent of the nesting grounds of green turtles (*Chelonia mydas*) found in Southeast Asia. The TB-MPA covers three islands in Malaysia, off the coast of Sabah, and six islands in the Philippines (see Figure 1).[65] It is

[64] WWF-Philippines, *Turtle Islands—Resources and Livelihoods under Threat* (Quezon City, Philippines: WWF-Philippines, 2005), at 5, available online: <http://assets.panda.org/downloads/turtleislandscasesrud3.pdf> (first TB-MPA for sea turtle conservation); UP-MSI, ABC, ARCBC, DENR, and ASEAN, *Marine Protected Areas in Southeast Asia* (Los Baños, Philippines: ASEAN Regional Centre for Biodiversity Conservation, 2002), at 51 (area of the TIHPA).

[65] Malaysia's islands are Pulau Selingaan, Pulau Gulisaan, and Pulau Bakkungaan-Kechil. Sabah is a Malaysian state located on the northern part of the island of Borneo. Philippines' islands are Boaan, Langaan, Great Bakkungaan, Lihiman, Taganak, and Baguan.

also part of the Sulu-Sulawesi Marine Ecoregion,[66] contributing to the protection of some of its unique features, such as coral reefs.[67] Initially proposed during a 1993 workshop organized by the World Wildlife Fund (WWF) in the region, the TIHPA was established through a memorandum of understanding between Malaysia and the Philippines on 31 May, 1996.[68]

Prior to its creation, some degree of protection had already been afforded by the two states to the areas in question. In the Philippines, only Baguan Island was already protected, having been proclaimed a marine sanctuary in 1982.[69] Since 1977, the three islands in Malaysia constitute the Turtle Islands Park, where conservation activities started as early as 1932.[70] The six islands of the Philippines are quite isolated, and more accessible from Malaysia than from its own capital, Manila. The size of the resident population in the Philippine islands is vulnerable to the attraction exerted by Malaysia's economic development on local job seekers and to political unrest in the Philippines.[71]

[66] Ecoregions are the basic planning unit of WWF's large scale approach to marine conservation in coastal and shelf areas; M.D. Spalding, H.E. Fox, G.R. Allen, N. Davidson, Z.A. Ferdana, M. Finlayson, B.S. Halpern, M.A. Jorge, A. Lombana, S.A. Lourie, K.D. Martin, E. McManus, J. Molnar, C.A. Recchia and J. Robertson, "Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas," *BioScience* 57, no. 7 (2007) 573–583. An ecoregion is "a geographic area that contains a distinct assemblage of natural communities sharing a large majority of species, dynamics, and environmental conditions, and which functions effectively as a conservation unit."; C. Horril, *Proceedings of the Eastern Africa Marine Ecoregion Visioning Workshop: 21–24 April 2001* (Dar es Salaam: World Wildlife Fund Tanzania Programme Office, 2002).

[67] E.F.B. Miclat, J.A. Ingles and J.N.B. Dumaup, "Planning across Boundaries for the Conservation of the Sulu-Sulawesi Marine Ecoregion," *Ocean and Coastal Management* 49, no. 9–10 (2006): 597–609, at 598.

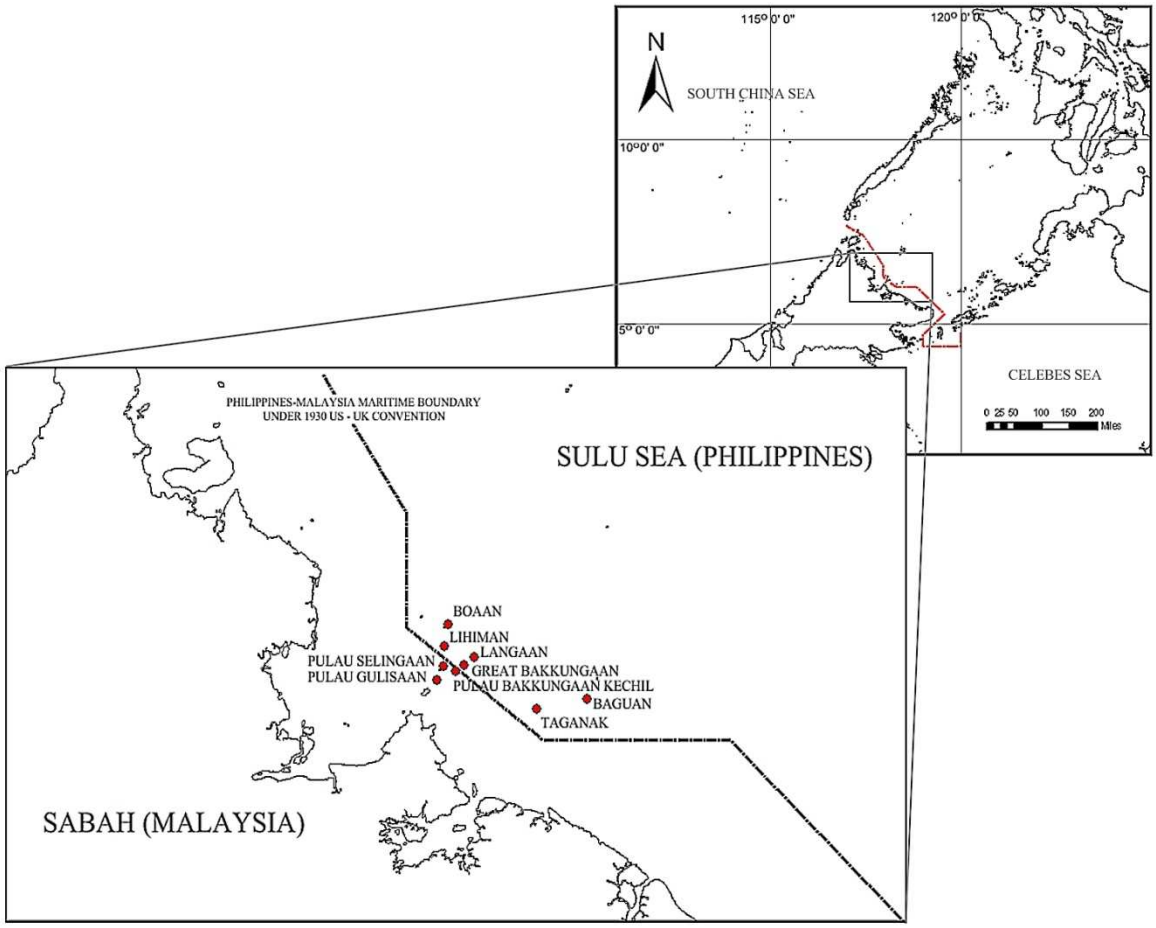
[68] "Memorandum of Agreement between the Government of the Republic of the Philippines and the Government of Malaysia on the Establishment of the Turtle Island Heritage Protected Area," *Journal of International Wildlife Law and Policy* 5, no. 1–2 (2002): 157–161. Only the Philippines were a party to UNCLOS at the time of the signing of the memorandum of agreement, with UNCLOS entering into force for Malaysia on 14 October 1996. Both states had ratified CBD at the time of the signing of the agreement.

[69] Available online: <http://www.sabahparks.org.my/pages/tip_intro.html> (Baguan island was declared a marine sanctuary before the TIHPA was created).

[70] UP-MSI *et al.*, see n. 64 above, at 20.

[71] WWF-Philippines, see n. 64 above, at 7.

Figure 1 – Turtle Islands Heritage Protected Area



The creation of the TB-MPA was an important milestone in MPA history. It affords protection to rare and emblematic biodiversity features—but it also takes a novel approach to marine conservation by overcoming the limits imposed by maritime boundaries between states for the sake of marine conservation.[72] In recognition of this, the national agencies responsible for the implementation and management of the Turtle Islands Heritage Protected Area were awarded the J. Paul Getty Wildlife Conservation Prize in 1997.[73]

In 2006, the six Philippine islands were included in the state's tentative list of sites for designation as World Heritage sites under the 1972 Convention Concerning the

[72] Physically, the TB-MPA is restricted to the nine islands previously mentioned, and the agreement only provides one set of geographical coordinates for each island. However, and because the Turtle Conservation and Management Programme (Annex A of the Agreement) proposes the "prohibition of the use of fishing gears contributing to mortality or disturbance of turtles within the TIHPA," it is inferred that TIHPA enforcement activities will also affect the waters between the islands.
[73] Available online: <http://www.oneocean.org/ambassadors/track_a_turtle/tihpa/>.

Protection of the World Cultural and Natural Heritage (World Heritage Convention).[74] The site was proposed under the designation of Turtle Islands Wildlife Sanctuary.[75] Malaysia has not yet tabled a similar proposal, neither is it clear whether it will in the near future.

Both Malaysia and the Philippines are involved in other marine conservation initiatives in the region. They are both member states of the revised Action Plan for the Protection and Development of the Marine Environment and Coastal Areas of the East Asian Seas (1994), an initiative of the UNEP Regional Seas Programme.[76] The plan provides a blueprint for international cooperation between the participating countries, including the conservation of marine and coastal habitats. Activities appear to be limited, however, to the conservation of coral reefs.[77]

3.1.2 Maritime Boundary and Maritime Zones

Cooperation is not without conflict. The TIHPA straddles the maritime boundary between the two states. The border was negotiated in 1930 by the United States and Great Britain (administrators, respectively, of the Philippines and Malaysia) and codified in a treaty between the occupying administrations.[78] The Philippines are not very satisfied with the existing line and insist it is a national territorial boundary because of their claim to sovereignty over Sabah, currently part of Malaysia.[79] No further boundary agreements have been reached by the two states on this particular boundary.[80]

In terms of the relevance of the maritime zones to the TIHPA, it is important to observe that Malaysia claimed a territorial sea of only 3 NM on the coasts of Sabah

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[74] *Convention Concerning the Protection of the World Cultural and Natural Heritage*, 16 November 1972, 1037 U.N.T.S. 151 (entered into force 17 December 1975).
[75] Available online: <http://whc.unesco.org/en/tentativelists/5032/>.
[76] *Action Plan for the Protection and Sustainable Development of the Marine and Coastal Areas of the East Asian Region (revised version)*, UNEP(OCA)/EAS IG5/6, Annex IV (2004), available online: <http://www.cobsea.org/documents/action_plan/ActionPlan1994.pdf>. No regional seas convention has been established in the East Asian Seas.
[77] Available online: <http://www.cobsea.org/activities/activities_strategic.html>.
[78] *Convention Regarding the Boundary between the Philippine Archipelago and the State of North Borneo*, 2 January 1930, London, H.M.S.O., 11 pp.
[79] Jay Batongbacal, doctoral student, Schulich School of Law, pers. comm. (3 March 2009); K. Kittichaisaree, *The Law of the Sea and Maritime Boundary Delimitation in South-East Asia* (Oxford: Oxford University Press, 1987): 46.
[80] Official website of the Division of Ocean Affairs and Law of the Sea of the United Nations, Malaysia, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/MYS.htm>; Philippines, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/PHL.htm>.

because of the conflicting claims of the Philippines to this territory.[81] Because the baselines are unknown,[82] it is not clear whether the waters of the three Malaysian islands fall under the territorial sea or under the EEZ beginning at the 3 NM limit. It seems reasonable to assume, however, that the islands would provide the geographical support for the baselines and the waters surrounding the islands would consequently fall inside the territorial sea.[83]

The Philippines, on the other hand, has declared in its constitution that the waters on the inward side of its archipelagic baselines constitute internal waters,[84] and not archipelagic waters as prescribed by UNCLOS. This irregular position *vis-à-vis* the relevant UNCLOS provisions has been deemed the most extreme in the South China Sea.[85] The Philippines has adopted colonial treaty limits as the seaward limits of its territorial sea.[86]

From this brief examination, it seems very likely that the maritime boundary straddled by the TIHPA divides the territorial seas of both Malaysia and the Philippines. Both states enjoy full sovereignty in their respective territorial seas, as limited by the right of innocent passage. Regarding the latent claim of the Philippines over Sabah, this coastal

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[81] The 3 NM territorial sea claim is mentioned in Malaysia's Emergency (Essential Powers) Ordinance, No. 7, 1969, where Article 4(2) reads as follows: "For the purposes of the Continental Shelf Act, 1966, the Petroleum Mining Act, 1966, the National Land Code and any written law relating to land in force in Sabah and Sarawak, any reference to territorial waters therein shall in relation to any territory be construed as a reference to such part of the sea adjacent to the coast thereof not exceeding three nautical miles measured from the low-water mark"; *Emergency (Essential Powers) Ordinance, No. 7, 1969, as amended in 1969*, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/MYS_1969_Ordinance.pdf>; on the reason for the 3 NM territorial sea, see Kittichaisaree, n. 79 above, at 46.

[82] An additional complicating factor is that, at the time of the creation of the TIHPA, Malaysia had failed to publicize the baselines from where the breadth of its maritime zones is measured; M.J. Valencia, "Validity of Malaysia's baselines and territorial sea claim in the northern Malacca Strait," *Marine Policy* 27, no. 5 (2003): 367–373, at 372. On 1 May 2007, Malaysia enacted the Baselines of Maritime Zones Act 2006, where rules for baseline delineation are set but no geographical coordinates are provided; *Baselines of Maritime Zones Act 2006*, available online: http://www.parlimen.gov.my/billindexbi/pdf/DR%20152006E.pdf.

[83] A consultation of the MPA global database has not yielded the limits of the TIHPA. L.J. Wood, *MPA Global: A Database of the World's Marine Protected Areas* (Vancouver: Sea Around Us Project, 2007), available online: <http://mpas.appspot.com/pa?id=agRtcGFzchULEg1Qcm90ZWN0ZWRBcmVhGIiIAgw>.

[84] Philippines *Constitution of the Republic*, (entered into force on 17 January 1973), available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/PHL_1973_Constitution.pdf>; Article 1 reads as follows: "The waters around, between and connecting the islands of the archipelago, irrespective of their breadth and dimensions, form part of the internal waters of the Philippines."

[85] B. Kwiatkowska and E.R. Agoes, *Archipelagic State Regime in the Light of the 1982 UNCLOS and State Practice* (Bandung: ICLOS, 1991), at 16.

[86] This claim seems also to preclude the Philippines from settling any international maritime boundaries with its neighbours. Prescott and Schofield, see n. 20 above, at 430.

state is not likely to be more vocal over the international status of the maritime boundary, given the remoteness of its six TIHPA islands.[87] Significant changes in boundary behavior are, therefore, not expected, and the functionality of the maritime boundary, as reflected in the cooperative behavior of both states for the purpose of sea turtle conservation, will likely not be jeopardized. The overlapping of the TIHPA with the territorial seas of both states, where they have sovereign rights to establish and manage MPAs, has probably been a facilitating factor in the creation of this TB-MPA.

3.2 Red Sea Marine Peace Park

3.2.1 Origin and History

The Red Sea Marine Peace Park (RSMPP) between Israel and Jordan has as its primary conservation goal to provide protection to the coral reefs found in the waters of the northern part of the Gulf of Aqaba (see Figure 2).[88] These northernmost reef-building corals are subjected to a restricted circulation regime, which limits the renewal of the waters through the Red Sea. This particular natural aspect of the gulf exacerbates the impacts of regional activities such as land-based pollution, fishing, aquaculture, port operations, tourism, coastal development, etc.[89] The RSMPP encompasses the Eilat Coral Nature Reserve in Israel and the Aqaba Marine Park in Jordan,[90] but it does not include the waters that separate them.

The creation of the RSMPP was motivated by the nature of the threats affecting the coral reefs in the Gulf of Aqaba, as well as the joint realization that problems of a

[87] This claim is much less prominent than the one over nine of the Spratly Islands, which are also disputed by Brunei, China, Malaysia, Thailand, and Vietnam; Jagota, see n. 40 above, at 126.

[88] The Gulf of Aqaba is the easternmost result of the bifurcation imposed by the Sinai Peninsula on the Red Sea. The westernmost gulf is the Gulf of Suez. The Gulf of Aqaba is bordered by Egypt, Israel, Jordan, and Saudi Arabia.

[89] M.E. Portman, "Zoning Design for Cross-Border Marine Protected Areas: The Red Sea Marine Peace Park Case Study," *Ocean and Coastal Management* 50, no. 7 (2007): 499–522; C. Zimmer, "The Partitioning of the Red Sea" Science 293, no. 5530 (2001): 627–628; M.P. Crosby, A. Abu-Hilal, A. Al-Homoud, J. Erez and R. Ortal, "Interactions among Scientists, Managers and the Public in Defining Research Priorities and Management Strategies for Marine and Coastal Resources: Is the Red Sea Marine Peace Park a New Paradigm?" *Water, Air and Soil Pollution* 123, no. 1–4 (2000): 581–594.

[90] Official website of the Red Sea Marine Peace Park, available online: <http://www.iui-eilat.ac.il/peacePark/webSite/index.html>. The Aqaba Marine Park integrates the Red Sea and Gulf of Aden Regional Network of MPAs, created under the auspices of the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden; W. Gladstone, F. Krupp and M. Younis, "Development and Management of a Network of Marine Protected Areas in the Red Sea and Gulf of Aden Region," *Ocean and Coastal Management* 46, no. 8 (2003): 741–761.

regional nature required peaceful regional cooperation. The overarching purpose of the RSMPP is, however, to promote cooperation and peace between the two states.

The peace park is a product of the US-mediated 1994 peace treaty between Israel and Jordan.[91] During the peace negotiations, the two states agreed to the development of the RSMPP as a means to foster bilateral cooperation and to protect the marine environment shared by the two states.[92] The particular peace-enhancing role of the RSMPP is associated with its designation as a peace park. They are defined by IUCN as "transboundary protected areas that are formally dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and to the promotion of peace and co-operation."[93]

Though the Gulf of Aqaba appears to be a marginal region for both states, the participation of Jordan in the TB-MPA is extremely significant in the context of the Middle East conflict. When the peace park was created, this state was seen as "a gateway for advancing peace between Israel and other Arab States."[94] Following the signing of the peace treaty, cooperation between the two states progressed into wider *forums* and into other areas of common interest, such as economic development and sharing of water resources.[95] However, bilateral cooperation in marine conservation has not been expanded

[91] *Treaty of Peace between the Hashemite Kingdom of Jordan and the State of Israel*, 26 October 1994, 34 I.L.M. 43 (1995). The Treaty does not mention specifically the creation of the Red Sea Marine Peace Park, however, article 18 underscores the importance of cooperation in environmental matters while Annex IV refers to "cooperation in planning and management of adjacent protected areas along the common border" as a subject to be addressed by both parties. The Gulf of Aqaba is one of the geographical areas where these actions are to be considered.

[92] "Binational Red Sea Marine Peace Park," *Israel Environment Bulletin* 20, no. 4 (1997): 57–58; Portman, n. 89 above. This TB-MPA seems also to have contributed overcoming the asymmetrical management capacities of the two states. In 1998, the Israeli Coral Reserve was considered to be well-managed, while the status of the Aqaba Marine Park resembled that of a "paper park"; M. Fouda, "Status of Coral Reefs in the Middle East" *in Status of Coral Reefs of the World*, 1998, Clive Wilkinson ed. (Townsville, Australia: Global Coral Reef Monitoring Network, 1998). "Paper park" is the common designation for legislated protected areas that lack management operations, thus failing to meet their objectives. By 2002, the management status of the Aqaba Marine Park had improved; C. Wilkinson ed., *Status of Coral Reefs of the World: 2002* (Townsville, Australia: Global Coral Reef Monitoring Network and Reef and Rainforest Research Centre, 2002).

[93] Sandwith *et al.*, see n. 10 above.

[94] Jordan was the second Arab state in the Middle East to sign a peace treaty with Israel, after Egypt in 1979; N. Kliot, "The Grand Design for Peace: Planning Transborder Cooperation in the Red Sea," *Political Geography* 16, no. 7 (1997): 581–603, at 581.

[95] *Id.*

into regional initiatives, such as the Red Sea and Gulf of Aden Regional Sea Programme.[96]

The role of the US in promoting the peace treaty and in further supporting the RSMPP cannot be understated. As a mediator of the 1994 peace treaty, the US supported the creation of the RSMPP by mobilizing both the United States Agency for International Development (USAID) and the National Oceanic and Atmospheric Administration (NOAA)[97] to provide financial and scientific assistance to the two states through the *Red Sea Marine Peace Park Cooperative Research, Monitoring and Management Programme*.[98] This US-funded project was initiated in 1999 to gather information on the circulation regimes in the Gulf of Aqaba, the location and types of marine resources available, and their condition. This information constitutes a knowledge base for the elaboration of the RSMPP management plan.[99]

3.2.2 Maritime Boundary and Maritime Zones

Before the 1994 peace treaty, a maritime boundary between the two states had not been delimited. The treaty did stipulate, however, that Israel and Jordan were to agree on a maritime boundary in the Gulf of Aqaba in the following nine months (Article 3.7). Only in 1996 was such an agreement concluded and their territorial seas clearly divided.[100] By that time, Jordan had ratified UNCLOS, while Israel is still not a party.[101]

The creation of the RSMPP seems to have taken place concurrently with the settling of the maritime boundary dividing the territorial sea of both counties. Still, because the RSMPP program, apparently the main driver of the TB-MPA activities,

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[96] Jordan is a party to the related *Regional Convention for the Conservation of the Red Sea and Gulf of Aden Environment* (Jeddah, 1982), its membership being restricted to Arab countries.

[97] B. Mieremet, *The Experience of a Lifetime: NOAA Marine Scientists Help Protect Red Sea Coral as Part of the Middle East Peace Process* (NOAA Feature Stories, 2002), available online: <http://celebrating200years.noaa.gov/magazine/mideast_peace_park/welcome.html>.

[98] "NOAA plays key role in Israeli-Jordanian Marine Peace Park Science Partnership Program," available online: <http://www.magazine.noaa.gov/stories/mag30.htm>.

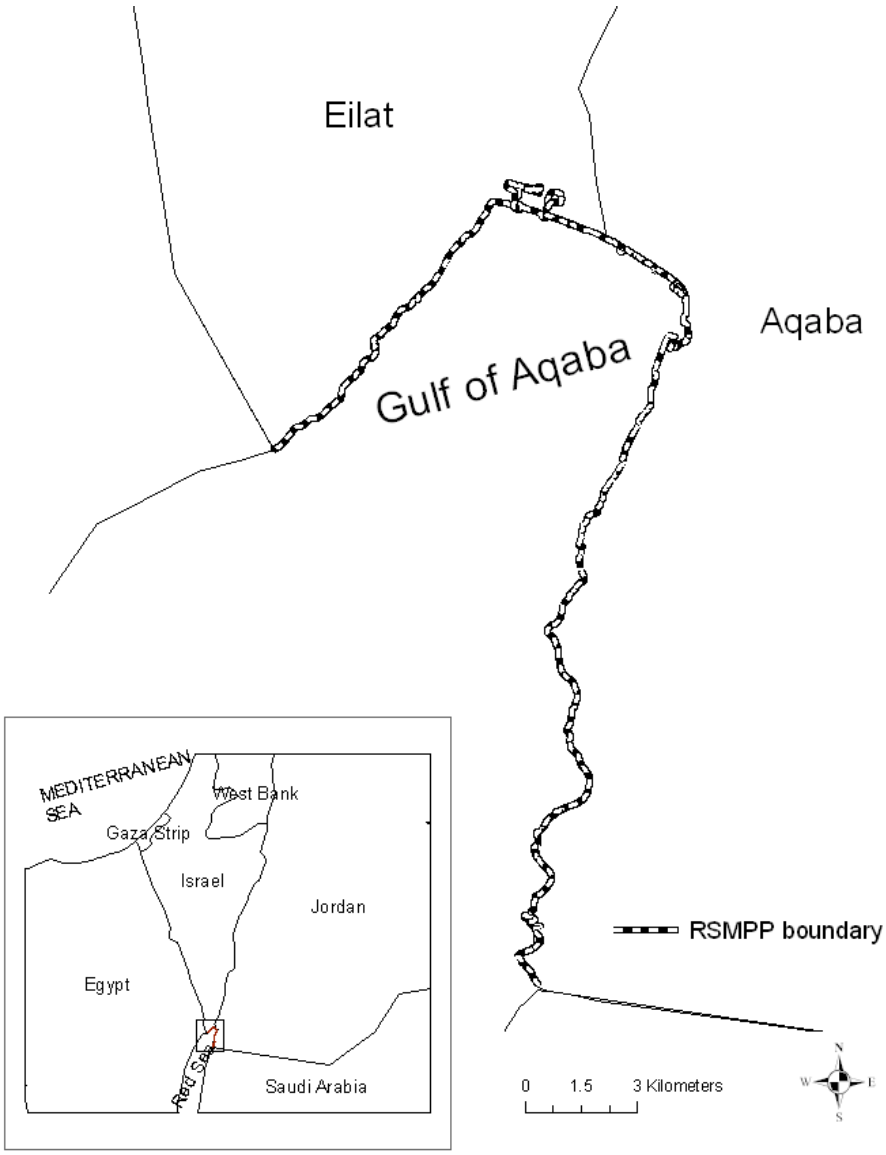
[99] Crosby *et al.*, see n. 89 above, pp. 240. The project was successfully concluded in 2003, and further activities were at the time dependent on additional funding; M.P. Crosby, ed., *The Red Sea Marine Peace Park Cooperative Research, Monitoring and Management Program—Final Report—Phase I* (unpub., 2003), at 22, available online: <http://www.iui-eilat.ac.il/peacePark/data/Final rsmpp report.pdf>.

[100] *Maritime Boundary Agreement Between the Government of the State of Israel and the Government of the Hashemite Kingdom of Jordan*, 18 January 1996, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/ISR-JOR1996MB.PDF>.

[101] Jordan acceded to UNCLOS on 27 November, 1995. Both states had ratified CBD at the time of the creation of the RSMPP.

started only in 1999[102] after the maritime boundary had been delimited, it is argued that the RSMPP necessitated the delimitation of the maritime boundary. This is supported by the lack of evidence of any joint activities taking place before the program was initiated.

Figure 2 – Red Sea Marine Peace Park



Currently, transboundary movements for the purpose of monitoring and researching the waters of the RSMPP are quite limited: scientists from both states have been reported to meet in their boats by the maritime boundary to calibrate their equipment and then proceed to survey their own waters.[103] The maritime boundary appears to be

[102] Crosby, see n. 89 above.
[103] Zimmer, see n. 89 above.

seen as a fence dividing the two states.[104] Given the political tensions that had existed between the two states, and that still exist in the region, this perspective of the maritime boundary, though not enhancing its functionality, has in fact facilitated the creation of the RSMPP.

On its own, the maritime boundary holds a strong symbolic and political power despite the cooperative environment that enabled its delimitation. Despite the likelihood of further collaboration across the maritime boundary, increasing its rather limited functionality, boundary behavior is, nevertheless, highly unpredictable in light of the volatility of regional political relations in this region.

3.3 Pelagos Sanctuary for Mediterranean Marine Mammals

3.3.1 Origin and History

The Pelagos Sanctuary for Mediterranean Marine Mammals (PSMMM)—established by France, Italy, and the Principality of Monaco—aims at protecting the cetaceans that aggregate in this area of the Mediterranean.[105] It covers internal waters (15 percent) and the territorial sea (32 percent) of the three states, as well as the high seas (53 percent).[106] It is an MPA of great regional importance (see Figure 3). With an area of more than 87,500 km^2, it is the largest MPA in the Mediterranean. It represents 90 percent of the marine area of the Mediterranean Sea under protection, and it is the only MPA in this region to include the high seas.[107]

The sanctuary was formally anticipated in a trilateral declaration of 22 March 1993,[108] following a proposal by the Tethys Research Institute and the European Association Rotary for the Environment. Through a joint project, these two organizations offered a novel rationale for the protection of marine mammals that feed in a multi-

[104] Another inference is that the RSMPP is not yet fully operational, as research and monitoring seem to have dominated the RSMPP Program. Despite the existence of a zoning proposal, a management plan appears to be absent, as well as a management authority; Portman, see n. 89 above.
[105] Cetaceans aggregate in the Pelagos Sanctuary due to the high concentrations of zooplankton on which they feed; G. Notarbartolo di Sciara, T. Agardy, D. Hyrenbach, T. Scovazzi and P. van Klaveren, "The Pelagos Sanctuary for Mediterranean Marine Mammals," *Aquatic Conservation: Marine and Freshwater Ecosystems* 18, no. 4 (2008): 367–391, at 370.
[106] *Id*.
[107] A. Abdulla, M. Gomei, E. Maison and C. Piante, *Status of Marine Protected Areas in the Mediterranean Sea* (Malaga, IUCN, 2008): 18.
[108] T. Scovazzi, "The Declaration of a Sanctuary for the Protection of Marine Mammals in the Mediterranean," *International Journal of Marine and Coastal Law* 8, no. 4 (1993): 510–514.

jurisdictional area of the north-western Mediterranean. Their initiative was fuelled, *inter alia*, by concerns mounting during previous decades about the impact of drift-net fishing on marine mammal populations.[109] Prior to the creation of the PSMMM, each state had already established in their waters protected areas with a marine component.[110] Additional conservation measures were also in place.[111]

The PSMMM came into being on 21 February, 2002, following entry into force of the international agreement signed on 25 November, 1999, among the three coastal states.[112] This was the first treaty specifically designed to proclaim a sanctuary for marine mammals.[113] Within the overall goal of ensuring a "favourable conservation status to marine mammals" (Article 4), the agreement addresses four main threats to marine mammals arising from human activities: pollution (Article 6), drift-net fishing (Article 7 (b)), unregulated whale watching (Article 8), and speedboat racing (Article 9). According to article 3, "[t]he sanctuary is composed of maritime areas situated within the internal waters and territorial seas of the French Republic, the Italian Republic and the Principality of Monaco, as well as portions of adjacent high seas." Article 14 specifies the jurisdiction of the three states:

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[109] Drift-net fishing is not allowed in the Pelagos Sanctuary. This provision goes beyond EEC Council Regulation No. 345/92 prohibiting the use of drift-nets longer than 2.5 km in the territorial waters of the member-states of the European Union as well as by vessels flying a member state's flag in the high seas; Council Regulation (EEC) No. 345/92 of 27 January 1992 amending for the eleventh time Regulation (EEC) No. 3094/86 laying down certain technical measures for the conservation of fishery resources (Off. Journ. Eur. Comm. No. L 42 of 18 February 1992, at 0015–0023). The ban on drift-net fishing in the Pelagos Sanctuary applies to all vessels, irrespective of their flag state.

[110] These coastal protected areas are quite small (0.5–20 km^2) and not all appear to include a no-take area.

[111] Regulation No. 345/92 is not applicable to Monaco, as it is not a member of the European Union. In 1993, Monaco prohibited the catching of marine mammals and the utilization of drift nets in its waters; *Order No. 10.798* of 15 February 1993, in *Journal de Monaco* of 19 February 1993. Following the 1986 Agreement between France and Italy on the boundary dividing their territorial seas in the Strait of Bonifacio, both countries approved in 1993 legislation prohibiting the circulation of vessels flying their flag and carrying dangerous substances through that strait; *Agreement between the Government of the French Republic and the Government of the Italian Republic on the Delimitation of Maritime Frontiers in the Area of the Strait of Bonifacio*, 28 November 1986 (entered into force 15 May 1989), available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/FRA-ITA1986MB.PDF>; France, *Prefectural Order No. 1/93 (Prohibiting the movement in the Bouches de Bonifacio of tankers carrying oil and ships carrying dangerous or toxic substances)*, 15 February 1993, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/FRA_1993_Order.pdf>; Italy, *Decree of the Minister of the Merchant Marine*, 26 February 1993, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/ITA_1993_Decree.pdf>.

[112] *Agreement on the Creation of a Mediterranean Sanctuary for Marine Mammals*, 25 November 1999 (entered into force February 2002), available online: <http://www.disciara.net/downloads/Pelagos_legal_texts.pdf>.

[113] T. Scovazzi, "The Mediterranean Marine Mammals Sanctuary," *The International Journal of Marine and Coastal Law* 16, no. 1 (2001): 132–145, at 133.

> *1. In the part of the Sanctuary located within the waters subject to its sovereignty or jurisdiction, each of the State Parties to the present Agreement is responsible for the application of the relevant provisions. 2. In the other parts of the sanctuary, each of the State Parties is responsible for the application of the provisions of the present Agreement with respect to ships flying its flag as well as, within the limits provided for by the rules of international law, with respect to ships flying the flag of third States.*[114]

This allocation of responsibilities reflects both the sovereignty of each state over its territorial waters, and the necessary cooperation to ensure the effectiveness of the TB-MPA beyond the national waters of the three states.

3.3.2 Maritime Boundaries and Maritime Zones

The inclusion of the high seas in the sanctuary directly addresses the peculiar situation of the western section of the Mediterranean Sea where most coastal states have refrained from claiming their EEZs,[115] placing the high seas just 12 NM from the coast.

That is the case of the three coastal states. France claimed its EEZ on the Atlantic coast but not on the Mediterranean. Here, and at the time of the creation of the sanctuary, it had claimed the territorial sea and legislated its continental shelf.[116] In 2003, it claimed an Ecological Protection Zone (EPZ) that extends for 60 NM beyond the territorial sea.[117] Like France, Italy had only claimed the territorial sea and legislated its continental shelf.[118] In 2006, it also extended its jurisdiction to an EPZ where ecological zones may

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[114] The wording of this provision is somewhat vague, referring to the "application" of the regulations, but not to their enforcement.

[115] This contrasts with coastal states in the Black Sea like Russia, Bulgaria, Romania, Turkey, and Ukraine, which have claimed their EEZs; B. Vukas, "State Practice in the Aftermath of the UN Convention on the Law of the Sea: The Exclusive Economic Zone and the Mediterranean Sea" *in Unresolved Issues and New Challenges to the Law of the Sea, Time Before and Time After*, A. Strati, M. Gavouneli and N. Skourtos eds. (Leiden: Martinus Nijhoff, 2005): 253.

[116] France legislated its continental shelf in 1968. However, it has not negotiated its boundaries with other Mediterranean coastal states. *Act No. 77–485 of 11 May 1977 amending Act No. 68–1181 of 30 December 1968 relating to the exploration of the Continental Shelf and the exploitation of its natural resources*, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/FRA_1977_Act.pdf>.

[117] P.H. Sand, "'Green' Enclosure of Ocean Space—Déjà Vu?" *Marine Pollution Bulletin* 54, no. 4 (2007): 374–376.

[118] Italy defined its continental shelf as "the sea-bed and subsoil of the submarine areas adjacent to the territory of the Italian peninsula and islands but outside the area of the territorial sea, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas"; *Act No. 6l3 on the Surveying and Production of Oil and Gas in the Territorial Sea and Continental Shelf, and Amendments to Act No. 6 of 11 January l967 on the Surveying*

be created for the protection of, *inter alia*, marine mammals.[119] Monaco claimed a 12 NM territorial sea, and reached an agreement with France on the boundary dividing their territorial seas.[120] In addition, Monaco approved its Code of the Sea, whereby it claims a territorial sea of 12 NM and sovereign rights over sea areas beyond this zone.[121] None of the three states has claimed the contiguous zone or the continental shelf beyond the 200 NM limit.[122] France and Italy have not yet negotiated a boundary dividing their territorial seas from the mainland, but have delimited a similar boundary in the Strait of Bonifacio.[123]

Other coastal states have also claimed EPZs in the Mediterranean. These maritime zones, which are not provided by UNCLOS, are, in practice, a more limited version of the EEZ regime.[124] Their emergence is, to a certain extent, an attempt to afford to the

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and Production of Oil and Gas, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/ITA_1967_Act.pdf>.

[119] Notarbartolo di Sciara *et al.*, see n. 105 above, at 375.

[120] The agreement with France is in respect of not only the boundary dividing the territorial seas of the two states but also of "the limits of maritime areas situated beyond the territorial sea of Monaco" (Article 2). Article 4 reflects cooperation between the two states:

> To prevent this Convention from being prejudicial to the normal fishing practices of the professional fishermen of the two countries, the Parties agree, as a neighbourly arrangement, to allow the Monegasque and French coastal fishing vessels to continue fishing the traditional fishing areas situated within Monegasque territorial waters and the neighbouring French territorial waters. These provisions shall not, however, constitute an obstacle to the establishment by each of the Parties, in its territorial waters, of one or more sanctuaries or areas for the protection of marine fauna and flora. The nationals of each of the Parties shall enjoy the same rights and shall be subject to the same obligations in the above-mentioned areas.

Convention on Maritime Delimitation between the Government of His Most Serene Highness the Prince of Monaco and the Government of the French Republic, 16 February 1984, (entered into force 22 August 1985), available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/MCO-FRA1984MD.PDF>. Monaco has not claimed an Ecological Protection Zone.

[121] Article L.210–1 of Book II ("Monaco's Sea Areas and Marine Environment") of the Code of the Sea, reads as follows:

> The State of Monaco shall exercise sovereignty over its territorial waters and sovereign rights over the sea areas situated beyond the territorial sea in accordance with the conditions prescribed by the international conventions on the law of the sea and by the sovereign orders necessary for their implementation.

Monaco promulgated its *Code of the Sea through Act No. 1,198* of 27 March 1998, available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/MCO_1998_Act.pdf>.

[122] Beyond the territorial sea, the Pelagos Sanctuary only covers a portion of the high seas. Because of this, the regime of the continental shelf does not have a bearing on the creation and management of this TB-MPA.

[123] *Agreement between the Government of the French Republic and the Government of the Italian Republic on the Delimitation of the Maritime Boundaries in the Area of the Strait of Bonifacio*, 28 November 1986, (entered into force 15 May 1989), available online: <http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/TREATIES/FRA-ITA1986MB.PDF>.

[124] Vukas, see n. 115 above, at 256.

Mediterranean the rights and duties of the coastal states in regard to conservation and management of marine resources, and of the protection of the marine environment under national jurisdiction.

Any possible claims to the full extent of the EEZ would overlap with those of opposite coastal states, and would place this sea entirely under national jurisdiction, a situation similar to that found in Southeast Asia, particularly in the Sea of Japan[125] and the South China Sea.[126] Two reasons have been advanced to explain reluctance in claiming the EEZ in the Mediterranean Sea. First, coastal states are apprehensive regarding the impact of the EEZ regime on the freedom of navigation in the main navigation routes of the Mediterranean, including the navigation of warships.[127] Second, if EEZs were to be claimed and the high seas eliminated from the Mediterranean Sea, the fishing fleets of the coastal states would have to restrict their activities to the maritime zones under the jurisdiction of their flag state.[128] As it is, the Mediterranean allows them to enjoy the freedom of fishing provided by the high seas regime.

While uncertainty about the consequences of replacing the high seas with EEZs has precluded the extension of national jurisdiction, it is clear that the *status quo* is itself a cause of uncertainty, as this delicate balance may shift at any time.[129] Concerns about the conservation of the marine environment and management of marine resources of the Mediterranean are not expected to motivate EEZ claims in this sea, given the proliferation of multilateral instruments and initiatives dealing with these issues.

Faced with this situation and as parties[130] to UNCLOS, the three states, in creating the Pelagos Sanctuary, exercised their duty to cooperate in the protection of the marine environment (UNCLOS, Article 197) and in the conservation and management of marine mammals in the high seas (UNCLOS, Article 120). The three states have, therefore, overcome the lack of EEZ and the management and conservation tools it provides for the

[125] Valencia, see n. 43 above.
[126] S.-M. Rhee and J. MacAulay, "Ocean Boundary Issues in East Asia: The Need for Practical Solutions" *in Ocean Boundary Making: Regional Issues and Developments*, D.M. Johnston and P.M. Saunders eds. (London: Croom Helm, 1988): 88–91.
[127] Vukas, see n. 115 above, at 254.
[128] Vukas, see n. 115 above, at 255.
[129] Scovazzi, see n. 113 above, at 138.
[130] France ratified UNCLOS on 11 April 1996; Italy on 13 January 1995; and the Principality of Monaco on 20 March 1996. The three states were already parties to CBD at the time of the creation of the TB-MPA.

conservation of the marine environment.[131] They have also done so in full respect for the UNCLOS, as the primary objective of the sanctuary is the conservation of marine mammals. The fact that the high seas included in the PSMMM would fall under the national jurisdiction of the three states if they were to claim their EEZs only strengthens the legitimacy of their entitlement to enforce the sanctuary's regulations in the high seas.

The absence of national jurisdiction over most of the sanctuary, and the incomplete delimitation of lateral boundaries of the territorial sea between France and Italy, were not deterrents to advancing cooperation in transboundary marine conservation. In 2001, the sanctuary was listed as a Special Protected Area of Mediterranean Importance (SPAMI) under the 1995 Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean,[132] created within the framework of the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, 1995 (Barcelona Convention).[133] This designation extends the sanctuary's regulations to all parties to the Barcelona Convention.[134]

In that same year, regulatory measures were put in place banning high-speed boat races within Italian territorial waters.[135] In 2004, the sanctuary's management plan was approved,[136] and, in 2006, the entire TB-MPA was nominated by Italy to enter into UNESCO's tentative list for World Heritage Sites, as provided by the World Heritage Convention.[137]

Analyzing now the functionality of the existing maritime boundaries, it must be noted that their permeability and capacity to not oppose cooperation is explicit. Neither the maritime boundaries dividing the territorial seas of France and Monaco, and of France and Italy in the Strait of Bonifacio, nor those delimiting the seaward extension of the

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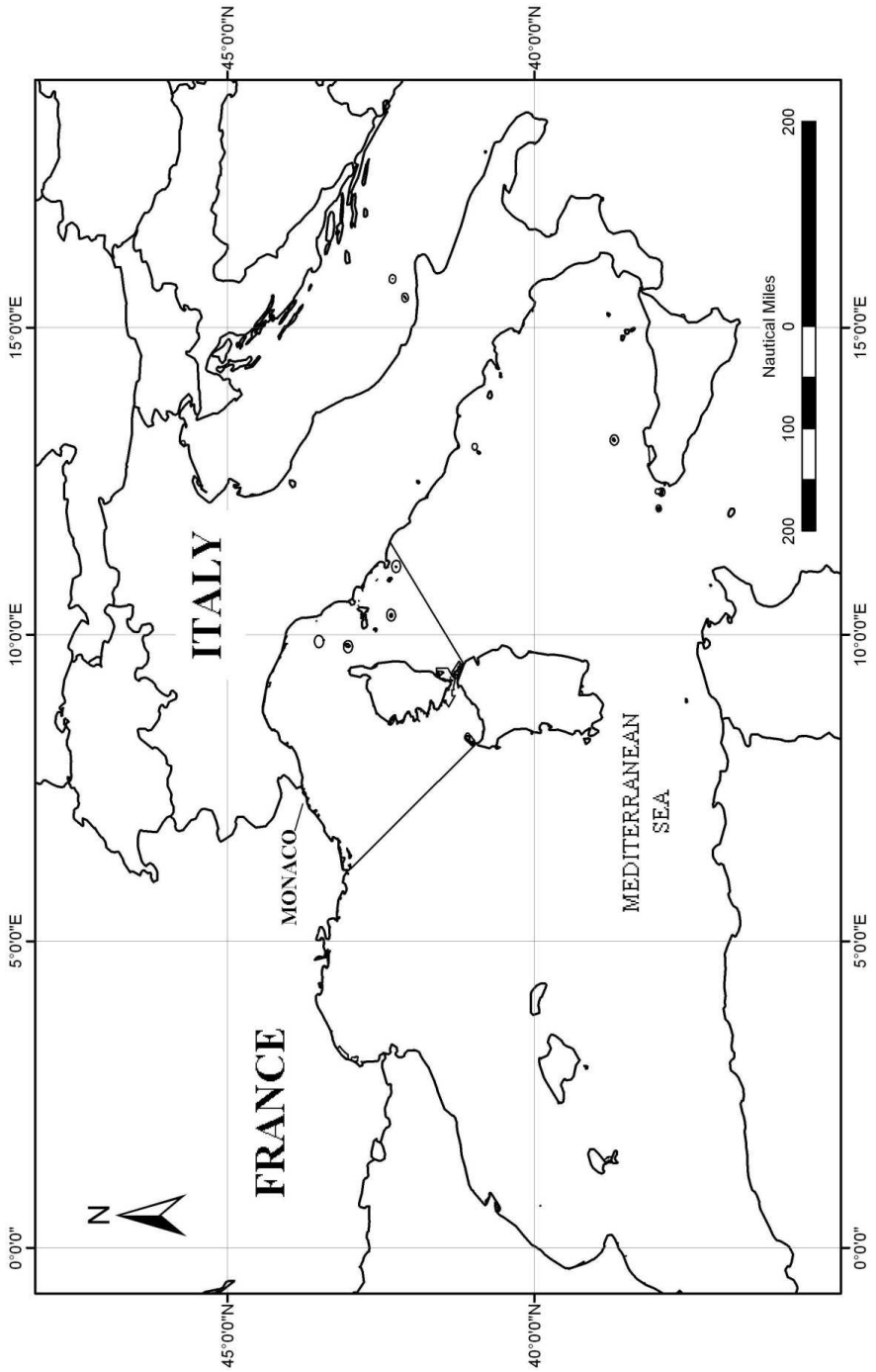
[131] Notarbartolo di Sciara *et al.*, see n. 105 above, at 374.
[132] *Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean, Amendments*, 10 June 1995 (entered into force 12 December 1999), 11 I.J.M.C.L. 101.
[133] *Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, Amendments*, 10 June 1995 (entered into force 9 July 2004) 31 L.O.S.B. 65.
[134] Scovazzi, see n. 113 above, pp. 141.
[135] Measures approved under the law implementing the Pelagos Sanctuary (Law No. 391 of 11 October 2001); A. Abdulla and O. Linden, *Maritime Traffic Effects on Biodiversity in the Mediterranean Sea—Review of Impacts, Priority Areas and Mitigation Measures* (Malaga, Spain: IUCN Centre for Mediterranean Cooperation, 2008).
[136] CBD Ad Hoc Open-Ended Working Group on Protected Areas, *Case-Studies on the Establishment of Marine Protected Areas beyond National Jurisdiction*, UNEP/CBD/WG-PA/1/INF/3, 17 May 2005, available online: <http://www.cbd.int/doc/meetings/pa/pawg-01/information/pawg-01-inf-03-en.doc>.
[137] Details on the justification for inclusion, available online: <http://whc.unesco.org/en/tentativelists/2032/>.

territorial sea of the three countries, have precluded cooperation in this joint initiative. It is clear that the political will of the three states was important to determine the functionality of the existing maritime boundaries.

Figure 3 – Pelagos Sanctuary for Mediterranean Marine Mammals



4. DISCUSSION

The preceding cases illustrate three particular contexts of interaction between maritime boundaries and transboundary marine protected areas in terms of the exercise of coastal

state sovereignty and jurisdiction in ocean areas. They also demonstrate that transboundary MPAs, like "national" MPAs, are motivated by and target different biological interests and concerns.[138]

TB-MPAs and maritime boundaries seem to be mutually influential in how coastal states exercise their sovereignty and jurisdiction, though to different degrees. In addition to the five contextual factors previously identified to influence maritime boundary-making (i.e., physical characteristics of the coastline, political relationships between coastal states, socio-cultural similarities, economic interests, and third party intervention), a sixth factor (i.e., similar maritime zones) was identified that may contribute to explain cooperation in transboundary MPA-making despite the state of the maritime boundaries. This emerges from the descriptive account of history and boundary issues of the three cases.

Those three TB-MPAs cover *similar maritime zones* on both sides of the pertinent maritime boundaries. All the TB-MPAs, with the exception of the Pelagos Sanctuary, overlap exclusively with the territorial seas of the states involved.[139] Consequently, all of the three TB-MPAs straddle the maritime boundary dividing the territorial sea of each state. Regarding the Pelagos Sanctuary, the inclusion of high seas areas and the consequent overlapping with the seaward limit of the territorial seas of the three countries is an atypical situation. The homogeneity of maritime zones covered by each TB-MPA has probably facilitated the implementation of TB-MPAs and the enforcement of regulations on both sides of the border by all the coastal states involved. In the case of the Pelagos Sanctuary, and though the inclusion of high seas areas introduces a contrasting level of jurisdiction in relation to that of the territorial sea, all of the three states are equally affected by the responsibilities imposed by the two different regimes. In other words, each state is responsible for the application of the sanctuary's regulations in their territorial sea, and the three share that same responsibility in the high seas.[140]

[138] The TIHPA protects sea turtles, the RSMPPP coral reefs, and the PSMMM marine mammals.
[139] It is not clear if the TB-MPAs also included internal waters. However, if they do, the portion of a TB-MPA lying within this maritime zone would not, in any way, be limited by the rights of other states. The TB-MPAs also did not overlap with the contiguous zone or the exclusive economic zone. In the case of the Pelagos Sanctuary, the continental shelf legislated by the three states is not part of the TB-MPA.
[140] It is not known, however, how the three states ensure enforcement of the Pelagos Sanctuary's regulations in the high seas, and if there are differences in responsibility among them.

The *physical layout* of the coastline has also influenced the boundary behaviour of the coastal states of the three TB-MPAs. In the TIHPA, the isolation of the islands in the Philippines have, to a certain extent, precluded this state from being more vocal regarding the status of the maritime boundary it shares with Malaysia.[141] The location of the two other TB-MPAs in semi-enclosed seas would be expected to produce comparable boundary behavior on the part of all the coastal states involved. However, that is hardly the case. In the RSMPP, maritime boundary delimitation preceded the creation of the TB-MPA, while in the PSMMM, the absence of a particular maritime boundary was not a deterrent to the creation of the TB-MPA. The examination of three additional factors can explain this discrepancy.

France, Italy, and Monaco have strong *political affinities* and *socio-cultural similarities*. The three countries are located on the more uniform northwest quadrant of the politically and culturally heterogeneous Mediterranean coast. Though Monaco, unlike France and Italy, is not a member of the European Union, and consequently not directly affected by its regional integration policy, the similarities in language and wealth with these two states, as well as Monaco's economic reliance on France, have probably provided a basis for cooperation in the implementation of the TB-MPA and in enforcing its regulations in the high seas. From this point of view, the Pelagos Sanctuary could not be more contrasting with the Red Sea Marine Peace Park, where both states are notoriously differentiated by their language, religion, and political system.[142]

The third factor distinguishing the boundary context of these two TB-MPAs was the *intervention of a third party*. The active and facilitative role of the US was unequivocally relevant in settling the maritime boundary between Israel and Jordan, and in engaging scientists and managers from both countries in the TB-MPA activities. This factor alone explains by itself the delimitation of the maritime boundary and the creation and management of the RSMPP. In the Pelagos Sanctuary, the initial intervention of two non-governmental organizations was quickly overtaken by the political will of the three states. The Turtle Islands Heritage Protected Area was also not indifferent to the influence of third parties. Though it is not completely clear what might have been the significance

[141] The involvement of the Philippines in the implementation and management of the TB-MPA should not be interpreted as this country's relinquishing its claim over Sabah.

[142] Israel is a republic where the official language is Hebrew and the dominant religion is Judaism. In a striking contrast, Jordan is a kingdom where Arabic is the official language and Islam the dominant religion.

of WWF organizing the workshop from where the TB-MPA emerged, its continued support of the TIHPA activities in cooperation with the respective state agencies has contributed, to a certain extent, to its longevity.

Lastly, *economic interests* do not appear to have been influential in the making of the three TB-MPAs. This is probably because the exploitation of marine resources in the sea areas covered by the three TB-MPAs is not significantly affected by TB-MPA regulations. The situation is not so linear when one considers the absence of claims to the EEZ by the three states that created the Pelagos Sanctuary. Economic considerations are most likely at the root of concerns regarding the freedoms of navigation and fishing, on the basis of which coastal states appear to be refraining from claiming their EEZs.

As regards to the *functionality* of the maritime boundaries, it is argued that, despite variation in the functional status of the maritime boundaries in the three cases, they all facilitate cooperation between the relevant coastal states, though to different degrees. The RSMPP maritime boundary is the most functionally limited, which is exemplified by the restricted circulation of peace park researchers and managers. Furthermore, it is not clear whether the maritime boundary has facilitated cooperation in other areas besides coral reef conservation. This case clearly demonstrates the conceptualization of a maritime boundary as a fence facilitating neighborliness,[143] and exemplifies one of the forms of cooperation predicted by UNCLOS (i.e., sharing of information).

In the TIHPA case, despite the Philippines' contesting of the international aspect of the maritime boundary, its functionality is not overshadowed: management activities are ensured and the movement of people across the boundary is not as restricted as in the RSMPP. This case also illustrates that even when a maritime boundary is the subject of a latent dispute, a transboundary MPA can still be created and managed effectively. The TIHPA goes beyond the forms of cooperation provided by UNCLOS for the protection of the marine environment by not only Malaysia and the Philippines sharing information, but also by their implementing conservation measures that are not restricted to the prevention of marine pollution.

[143] Springer, see n. 47 above.

The maritime boundaries in the PSMMM are especially functional when compared with those of the other two TB-MPAs. Each state has the duty to apply the TB-MPA regulations in its territorial sea and this responsibility is exercised by the three states in the high seas. What is most impressive in the Pelagos Sanctuary is, therefore, not only the functionality of the existing maritime boundaries between France and Monaco, and of the seaward limits of the territorial seas of the three states, but also the fact that neither the absence of a maritime boundary between France and Italy, nor the limited jurisdiction of the three coastal states over the high seas for the purpose of conserving marine mammals, were sufficient to prevent the creation of the TB-MPA. The PSMMM is, therefore, exemplary in demonstrating that transboundary MPAs do not always require the existence of maritime boundaries between the interested coastal states. The sanctuary is also a pioneer in the application of the concept of high seas marine protected areas. For these reasons, the three states have significantly expanded the scope of cooperation in the protection of the marine environment as defined by UNCLOS.

In summary, the Turtle Islands Heritage Protected Area and the Pelagos Sanctuary for Mediterranean Marine Mammals have, to a certain extent, overcome unresolved or potential disagreements over maritime boundaries and marine space by promoting transboundary cooperation in regard to the specific issue of marine conservation.[144] This is not to infer that the proclamation of TB-MPAs may be recommended to resolve maritime boundary disputes. However, focusing cooperation efforts on marine conservation has the potential to avoid confrontation between states[145] and to provide a basis for advancing collaboration in other issue areas.

5. CONCLUSION

This article set out to provide insights into the interactions between the existence or creation of maritime boundaries and the prospect for the emergence of transboundary marine protected areas in the context of coastal state sovereign rights and jurisdiction. The three examples analyzed have demonstrated that, at least, six factors affecting this relationship need to be considered in the creation of transboundary marine protected

[144] They are, in this sense, a particular type of boundary arrangement comparable to a Joint Development Zone. The creation of French and Italian Ecological Protected Zones beyond their territorial seas further reinforces this perspective.
[145] Valencia, see n. 43 above.

areas. Most importantly, it was shown that cooperation in marine conservation does not necessarily require the delimitation of maritime boundaries. However, generalizations on this point require caution, as the contexts in which these transboundary MPAs have been established seem to point to the value of this form of transboundary cooperation in the absence of valuable economic resources or other salient issues with the potential to fuel boundary disputes. Still, transboundary MPAs have the potential to overcome boundary divergences that are purely territorial, and thus constitute a boundary arrangement that may provisionally or permanently replace an actual maritime boundary.

As cooperation between coastal states in marine conservation advances, more transboundary MPAs are expected to be created as a tool to advance marine ecosystem-based management. Overcoming the political borders that bind our conservation efforts may be less difficult than was once foreseen.

PART III – CONCLUSIONS

11.CONCLUSIONS

11.1 Summary of Findings

The purpose of this thesis was to investigate the possibility of bilateral, and potentially trilateral, cooperation for the creation and management of transboundary networks of marine protected areas, and the governance requirements of such forms of cooperation. A case study and interdisciplinary approach was applied to two study areas – the transboundary coastal regions between Mozambique and Tanzania and between Mozambique and South Africa – and two marine resources – coral reefs and Indo-Pacific humpback dolphins (*Sousa chinensis*). This resulted in the production of seven autonomous, non-sequentially produced but inter-related research papers that contributed to answering the main research question (see page 14) and related research subquestions (see page 96).

In Chapter 4, common pool resource theory formed the analytical basis for the examination of the ecological characteristics, threats and institutional arrangements associated with coral reefs and Indo-Pacific humpback dolphins in each of the study areas. This chapter answered research subquestions #1 and #2. It was found that transboundary MPAs can be effective in the protection of coral reefs in the border between Mozambique and South Africa, and in the protection of humpback dolphins in the border between Mozambique and Tanzania. In contrast, transboundary MPAs may not be the best tools to protect coral reefs in the border region between Mozambique and Tanzania, and to protect humpback dolphins in the border region between Mozambique and South Africa. This interdisciplinary analysis suggests that similar assessments of the ecological characteristics of species and habitats, their particular threats, and the specific institutional arrangements that govern them, are essential to assess the adequacy of MPAs to protect them. Furthermore, it is argued that, when considering creating MPAs, states should not only assess the adequacy of MPAs to protect particular biodiversity features, but also how do MPAs perform in comparison to other tools such as co-management. This is particularly relevant in developing contexts where fisheries are an important source of animal protein to coastal communities.

In Chapter 5, the domestic governance frameworks of Mozambique, South Africa and Tanzania in respect of MPAs were compared to identify commonalities and differences in institutional procedures, principles and values, as well as the impact these may have on the creation and management of transboundary MPAs. This chapter answered research subquestion #3. Criteria drawn from the MPA and integrated coastal and ocean management literature, and from the regime theory literature were used to compare states' performance, and led to the conclusion that, despite the modernity of the policy and legal frameworks of Mozambique, South Africa and Tanzania, there are important differences and insufficiencies in the three countries that need to be taken account in considering the creation of transboundary MPAs between them. These insufficiencies include, among others: the lack of a clear mandate for MPA-making in Tanzania and Mozambique; the lack of a clear legal definition of MPA in Tanzania; lack of capacity, most visibly in Mozambique; weak system for MPA governance review in the three countries; etc. It is suggested that a better definition of domestic lead roles for negotiating transboundary MPA-making, and even leading to the joint management of transboundary MPAs, would facilitate such processes.

In Chapter 6, the extent to which international environmental law can assist in the creation and management of transboundary MPAs in the East African region was examined. This chapter answered research subquestion #7. Globally, UNCLOS and CBD are the key instruments for the establishment of transboundary MPAs and networks of MPAs. Regionally, the Nairobi Convention, and more specifically its Protected Areas Protocol, and the SADC Wildlife Protocol provide the legal foundation to create and manage transboundary networks of MPAs. The chapter concluded that it is at the regional, and most likely bilateral and trilateral levels, that a political and legal approach will be most effective.

In Chapter 7, the prospects for the creation of transboundary MPAs in East Africa are examined through the lenses of regime theory. This chapter answered research subquestions #3 to #6. A fully developed regime between Mozambique and South Africa was identified, which is independent of the fact that these two countries have already declared a joint transboundary MPA. In other words, the core of a regime – i.e., principles and norms – was already in place before the two countries declared their joint transboundary MPA. The proclamation of the transboundary MPA materialized the rules and decision-making procedures that also define this regime, and consequently made it

operational. In contrast, there is not yet a regime for transboundary MPA-making between Mozambique and Tanzania due to divergent principles. It is concluded that analysing what may drive, facilitate or constrain states in creating regimes for cooperation in transboundary marine conservation can assist decision-makers in anticipating issues that have the potential to constrain the creation and management of transboundary MPAs.

In Chapter 8, the diplomatic and management options that states may consider in the creation of transboundary MPAs were discussed. This chapter answered research subquestion #8. These options are intended to assist Mozambique, South Africa and Tanzania in cooperating in the protection of their shared marine environment, if the obstacles to cooperation identified in Chapter 7 are overcome. Five options for the establishment and management of transboundary MPAs are suggested, along with the necessary actions to be taken, thus depicting increasing political commitment between the three countries: i) independently established and managed MPAs on both sides of the border; ii) independently established and managed MPAs, with cross-border information-sharing mechanisms; iii) coordinated establishment and management of MPAs; iv) joint establishment of two transboundary MPAs; and v) trilateral sub-regional diplomatic and management agreements. These options can be considered as alternative goals, or as steps in achieving the highest degree of political cooperation.

In Chapter 9, networks of MPAs are brought back to center of the discussion. Though this thesis purported initially to address the establishment of transboundary networks of MPAs, the preceding chapters generally concern the establishment of transboundary MPAs. Indeed, though the TRANSMAP project prepared proposals for the creation of transboundary networks of MPAs between Mozambique and Tanzania and between Mozambique and South Africa, fieldwork revealed that establishing TBNMPAs was seen as a subsequent step, and more precisely a technical option for the zoning of transboundary MPAs. This chapter revisits the topic of networks of MPAs by focusing on the case of MPA networks that include community-based MPAs. It contributes to answer research subquestion #8 by exploring how institutional interplay within MPA networks with community-based MPAs can assist in their management. By analyzing ten such MPA networks, it is concluded that institutional interplay generally concerned exchange of information and issues of control and authority, which may have influence on MPA effectiveness. However, institutional interplay can involve high transaction costs, and consequently its promotion should be carefully considered.

Finally, Chapter 10 examined how maritime-boundary-making can affect cooperation between states in the creation of transboundary MPAs. This inquiry is important for the Mozambique-South Africa case, as these two countries have not delimited maritime boundaries between them. It also responds in part to research subquestions #6 and #8. Three already established transboundary MPAs and the maritime boundaries they straddle were examined to assess how the two interacted and affected cooperation between the states involved. It is concluded that, and contrary to common belief, the creation and management of a transboundary MPA does not necessitate the delimitation of maritime boundaries between the involved states if there are not any salient issues that could prevent such cooperation. This conclusion was confirmed in August 2009 when Mozambique and South Africa proclaimed their joint transboundary MPA, shortly after this chapter was accepted for publication in the Ocean Yearbook.

11.2 Interdisciplinary Approach

The previous summary of the conclusions of this thesis reflects the importance of having adopted an interdisciplinary approach. These show that the problem at hand could not be solely addressed through the lenses of a single discipline or field of knowledge.

A perspective based solely on natural sciences would have shadowed the socio-economic importance of marine resources in each transboundary region, and would have not allowed a clear understanding of the interplay of specific political and legal issues in each transboundary region. For example, focusing simply on marine biology or ecology would restrict this research to scientific proposals to designate MPAs, including their placement in regards of the ecological characteristics of coral reefs and Indo-Pacific humpback dolphins. Advancing such proposals only on the basis of ecological and conservationist considerations would ignore the social, economic, legal and political contexts in which they would be implemented.

A merely sociological and ethnographic view of cooperation for the creation and management of transboundary networks of MPAs would only study the societies to be affected and involved in such tasks. Consequently, though acknowledging local socio-economic settings, it would ignore the ecological characteristics of resources necessitating conservation measures, the legal obligations of states, and the international relations setting in which cooperation could take place. If this narrow view had been

adopted, the relationships between marine resources and society would not have been comprehended.

A purely legal view of the problem of transboundary MPA-making could stress the need for maritime boundary delimitation prior to the creation of a transboundary MPA, which it was found not to be always necessary. Also a purely legal approach would probably focus only the principles and rules of states codified in their domestic legal frameworks, and those codified in international legal instruments to which they subscribe, which would ignore the political issues that shape how states act in spite of their legal frameworks. An exclusively international relations approach would ignore local realities of each transboundary site, by examining cooperation between states only as an issue influenced by the behavior of states in the international arena.

Finally, a purely legal-political approach would likely ignore the ecological characteristics of the marine environment that countries would be protecting through transboundary MPAs, and hence could be promoting a technical solution – i.e., transboundary MPA – that may not necessarily be the most adequate to a particular context, as it was shown in the examination of the adequacy of transboundary MPAs to protect coral reefs and Indo-Pacific humpback dolphins in the two study areas.In sum, the interdisciplinary approach used in this thesis made use of different but highly complementary disciplines that were crucial to the multidimensional problem-oriented research reported in this thesis.

11.3 Contribution of the Thesis

This thesis adopted a novel approach to the study of marine protected areas, thus making important contributions to current knowledge of marine protected areas and regime building for transboundary marine conservation.

The novel approach consisted in the combined use of common pool resource theory and regime theory to examine the governance requirements of cooperation in the creation and management of transboundary MPAs. Though there have been some theoretical explorations of the combined use of those two theories, this thesis is, to the best of the author’s knowledge, the first time that CPR theory and regime theory are applied in an integrated manner to the study of MPAs and, more specifically, to the study of transboundary MPAs, and even more specifically in an African context.

This theoretical and interdisciplinary approach has elicited the following conclusions and key contributions to knowledge. First, coral reefs can be protected through a transboundary MPA in the border region between Mozambique and South Africa, but humpback dolphins likely cannot; also, coral reefs may not be adequately protected through a transboundary MPA in the border region between Mozambique and Tanzania, but humpback dolphins may be. Second, there is not a regime between Mozambique and Tanzania for the joint protection of their marine environment, because Mozambique's priority is to explore the potential hydrocarbon reserves in its waters; there is a regime between Mozambique and South Africa for that same purpose, which has already materialized in the proclamation of a joint transboundary MPA. Third, and until Mozambique and Tanzania take appropriate actions regarding the conservation of their shared marine environment, a trilateral/sub-regional approach to transboundary marine conservation is unlikely to emerge. Finally, states considering the creation of transboundary networks of MPAs to assist in meeting international MPA coverage targets can consider the creation of a transboundary MPA as a first step toward TBNMPAs. An example to consider in this regard is the case of the Great Barrier Reef Marine Park in Australia that recently established a network of no-take areas within its boundaries (Fernandes et al. 2005).

11.4 Policy Implications

The findings of this thesis can have implications for MPA-related policy-making in the East African region, particularly in the three countries examined, and elsewhere in the globe. These policy implications are of particular importance to marine biologists and ecologists, marine managers and to professionals involved in regime building in the region.

The first policy implication of the findings is that the creation of MPAs should be preceded by an examination of the particular species and habitats a given MPA would be protecting, as well as of the threats posed to them. Most importantly, though, MPAs should be established when they are the appropriate institutional arrangements to deal with existing threats and the particular ecological characteristics of the marine species and habitats. Creating a new MPA where there are already institutional arrangements in place, though weak, can add an unnecessary layer of institutional and managerial complexity. It is furthermore recommended that proposals for the creation of MPAs at particular sites

should be compared with the *status quo*, and other management tools, in the same fashion that a given project is assessed in Environmental Impact Assessments. This can be particularly critical in developing countries where coastal communities often depend directly on coastal and marine resources for their livelihoods, but also where mistakes in marine management can come at a higher cost. Although it is recognized that many MPAs are often created opportunistically, that is an unlikely situation for transboundary MPAs, given the sovereignty issues at stake.

The second policy implication concerns the prospects for regime building in the East African region. The lead taken by Mozambique and South Africa could set an encouraging example for other countries in the region to establish transboundary MPAs where these are needed and appropriate. However, policy-makers in other countries of the region are reminded of the particular context in which this transboundary MPA was created, as well as of the time elapsed since a political agreement was signed to create that transboundary MPA until it was actually proclaimed.

A final word of caution concerns the implications of these findings to the East African region, developing countries in other regions of the world, and even developed countries. The research reported in this thesis is rooted in two very particular geographical, ecological, political and economic contexts, even though they are found within the same country (i.e., Mozambique). This in particular should be taken by policy-makers elsewhere as a warning concerning the limitations of applying these findings to elsewhere without sufficient regard to context, even within the East African region. Nevertheless, the diplomatic and management options proposed in Chapter 8 can inform transboundary marine conservation initiatives elsewhere. These were proposed following an examination of transboundary conservation initiatives in very distinct contexts, and are sufficiently general to be adapted to other contexts.

11.5 Future Research

The findings of this thesis are not final, and though they purport to be comprehensive, they are not exhaustive. There are always gaps in knowledge that could not be filled during the research. One of the reasons for this is that the particular contexts in which this research was carried out will certainly change. Another is that some issues identified

during the elaboration of this thesis were not completely clarified because they were out of its scope. Some of these constitute interesting lines of inquiry for future research.

First, the differences between the performance of MPAs and that of co-management institutions in promoting the sustainable use of marine resources in particularly impoverished areas of developing countries (e.g., BMUs in Tanzania and CCPs in Mozambique) remain unclear.

Second, there are several local NGOs active in MBREMP and QNP, which are active in either promoting co-management institutions or alternative income-generating activities. It is not clear, however, if this focus of their work resulted from community needs identified prior to the creation of these MPAs, or if they resulted in part of the poor performance of MPAs in those regards.

Third, an in-depth historical account of the actions that led to the formation of the regime between Mozambique and South Africa could elicit nuances in its creation that were not captured in this research.

Finally, the transboundary MPA between Mozambique and South Africa and other transboundary MPAs elsewhere in the world (e.g., Pelagos Sanctuary for Mediterranean Marine Mammals, Turtle Islands Heritage Protected Area) offer an interesting opportunity to study the assumptions of transboundary marine conservation and how these compare to those behind the creation of many transboundary protected areas on land.

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APPENDIX I – QUESTIONNAIRES

QUESTIONNAIRE – coral reefs and humpback dolphins

IMPORTANT: Explain that the questions we will ask are for us to know more about how people here use coral reefs, and a particular type of dolphin.

I – PERSONAL INFORMATION

Village/Community:_____ Date:___/___/2009 Interviewer: _____
A. Respondent_____ B. Age:____ C. Sex: M__; F__
D. Main activity: _____
E. Place of birth: _____ F. Place of living: _____
G. Lives here since:_____ H. If living here for more than 5 years, why here?_____
I. Persons in family/household: Men_____; Women_____; Children_____
J. Attended school: Yes__; No__. If yes, up to grade:_____

II – INFORMATION ON ACTIVITIES

1. Which activities does your family do to have food and money? Rank them according to importance. (Indicate: ++ - mainly for money/food; + - also for money/food; x – not for money/food)

Rank	Activity	Money	Food
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. Which of these activities are done in the coral reefs or with coral reefs? (write down rank number)

_____

(**NOTE:** if there is at least one activity in or with coral reefs, do section III)

3. When you (or your family) do any of those activities, do you see dolphins? If yes, which kind?

_____

(**NOTE:** show the **THREE main** dolphin species in the field guide; if humpback dolphins are selected, do section IV).

III – CORAL REEFS

Fill the table below for the activities done **ONLY** in or with coral reefs.

4	Marine activity / marine or coastal resource exploited				
5	Method/equipment used (mention type of net, mesh, length, number of hooks, number of lines, type of tool, knife, spoon, etc.)				
6	To whom does the equipment belong to? (if to respondent, to boss, to a group, etc.)				
7	How did you get the equipment? (bought, made it, received it, etc) How much did				

	you pay for it?				
8	How do you get to the places where you fish / collect, etc.? (if by boat, type of boat: rowing, sailing, engine)				
9	How long does it take to get to the places where you fish / collect?				
10	How often do you do this activity? (per day, per week, per month)				
11	When do you do this activity? (day/night, high/low tide, all year round or just in specific times, etc.)				
12	What is the best season? (time of year/tide, etc., where catch is greatest)				
13	How much time do you spend in this activity? (n. of hours per day/out)				
14	Do youwork alone or with more people? (indicate how many people and how catch is divided)				
15	Catch/quantity caught or collected per day or out? (kgs, buckets, bunches, baskets, etc.)				
16	How much of what you catch is sold?				
17	Where do you sell it? To whom?				
18	How much do you make a day/per month?				
19	What price do you sell for? (per kilo, bucket, unit, bunch, etc.)				
20	If you sell to a seller, do you know where (s)he takes what (s)he bought from you?				

21	Mention main species and rank them accordig to importance.	1._____ 2._____ 3._____ 4._____	1._____ 2._____ 3._____ 4._____	1._____ 2._____ 3._____ 4._____	1._____ 2._____ 3._____ 4._____
22	Can anyone do this activity? If not, who can? How do you get permission?				
23	Can you catch how much you like? If not, who decides what to catch?				
24	If someone takes more than it should, what happens? (sanction/punishment, monitorint)				
25	Do you always have to catch the same quantity, or does it change over time?				
26	Do you know if the law allows this activity?				

27. Do you think that coral reefs are better or worse than five years ago? _____
Why?

#1 Cause_____ Effect_____

#2 Cause_____ Effect_____

#3 Cause_____ Effect_____

#4 Cause_____ Effect_____

28. Which activities do you think are bad for corals? Why?

_____

_____

29. Which one is worse? Why?

_____

IV – HUMPBACK-DOLPHIN

30. How do you call this animal?

_____

31. How can you tell the difference between this animal and other animals that look alike?

_____

_____

32. Where have you seen this animal?

_____

33. Can you explain in which situation did you see this animal? (what were you doing; what was the animal doing, was it dead or alive)

_____

_____

34. Do you usually see it in some particular time of the year? Which? What do you see the animal doing then?

_____

35. Have you ever used this animal for anything? When? What for? (if not, why not? For food, for example)

_____

_____

36. Do you know if other people use this animal for anything? What for?

_____

_____

37. Where do you see those people using this animal?

_____

_____

Thank respondent for her/his time and patience in answering our questions.

QUESTIONNAIRE – tourism operators

IMPORTANT: Explain that the questions we will ask are for us to know more about tourism activities associated with the coral reefs and with marine mammals.

I – PERSONAL INFORMATION

Village/Community:_____ Date:___/___/2009 Interviewer: _____
A. Respondent_____ B. Age:____ C. Sex: M__; F__
D. Main activity: _____
E. Place of birth: _____ F. Place of living: _____
G. Lives here since:_____ H. If living here for more than 5 years, why here?_____

II – SCUBA DIVING

4. For how long have you been running your scuba diving business here?_____

5. How many people work here?
   a. Peak season:from _____ to _____; # people_____
      from _____ to _____; # people_____
   b. Low season: from _____ to _____; # people_____
      from _____ to _____; # people_____
6. Where do you usually take people to? (location; type of habitat: coral reef, rocky bottom, etc.)_____
   _____

7. How many boats do you have to get there?_____

8. How many people can each boat take?_____

9. On average, how full is the boat per trip?
   a. Peak season: # people_____
   b. Low season: # people_____

10. How many boat trips do you do in one day:
    a. Peak season: # trips_____
    b. Low season: # trips _____
11. How long does each diving trip last?_____

12. Where do your clients come from?

____%	This region	____%	Other places in the country	____%	Other African countries
____%	Europe	____%	America	____%	Asia

13. Do you give any instructions to divers about diving in coral reefs? If yes, what are these?_____
    _____

14. During a diving trip, do you do any other activities with the divers? (e.g., lunch by the beach, etc.) If yes, what are these?_____

15. Have you noticed any changes in the state of the coral reefs in the last 5 years?_____ If yes, what changes are those and what do you think causes them?
    #1 Cause_____ Effect_____
    #2 Cause_____ Effect_____
    #3 Cause_____ Effect_____
    #4 Cause_____ Effect_____

16. Which activities do you think are bad for corals? Why?
_____
_____

17. Which one is worse? Why?
_____

18. Are you aware of any regulations and/or legislation regarding scuba diving in general and in coral reefs in particular?_____ If yes, which?
_____
_____

III – WHALE & DOLPHIN WATCHING

19. For how long have you been running your whale & dolphin watching business here?_____
20. How many people work here?
    a. Peak season:from _____ to _____; # people_____
       from _____ to _____; # people_____
    b. Low season: from _____ to _____; # people_____
       from _____ to _____; # people_____

21. Where do you usually take people to? (location; type of habitat)
_____
_____
22. How many boats do you have to get there?_____
23. How many people can each boat take?_____
24. On average, how full is the boat per trip?
    a. Peak season: # people_____
    b. Low season: # people_____
25. How many boat trips do you do in one day:
    a. Peak season: # trips_____
    b. Low season: # trips _____
26. How long does each whale watching trip last?_____
27. Where do your clients come from?

____%	This region	____%	Other places in the country	____%	Other African countries
____%	Europe	____%	America	____%	Asia

28. Do you give your clients any explanations about what they see? If yes, what are these?
_____
_____

29. What species of dolphins can you see in a trip? (show three main dolphin species in the field guide)
If humpback dolphins are indicated, fill this table for humpback dolphins **ONLY**:

a. Where do you usually see these dolphins? (distance to shore, bottom type, depths)	b. In which time of the year do you see them more?	c. What are these dolphins doing when you see them? (w/ calves? feeding?)	d. Do you know where else the dolphins you see can be found?
e. Do you see more or less of these dolphins than 5 years ago?	f. Do you know of any activities that may hurt these dolphins?	g. Which of these activities do you think is worse for them?	h. Do you know if people here make any other use of these dolphins besides dolphin watching?

30. During a whale watching trip, how do you approach dolphins and whales?
_____
_____

31. During a whale watching trip, do you do any other activities with your clients? (e.g., checking the coral reefs, etc.) If yes, what are these?
_____

32. Have you noticed any changes in the numbers of marine mammals in the last 5 years?_____ If yes, what changes are those and what do you think causes them?
    #1 Cause_____ Effect_____
    #2 Cause_____ Effect_____
    #3 Cause_____ Effect_____
    #4 Cause_____ Effect_____

Thank respondent for her/his time and patience in answering our questions.

APPENDIX II – INTERVIEW SCRIPTS

INTERVIEW SCRIPT FOR TYPE A ACTORS[1]

Date: _____/_____/_____ Country: Mz…☐; SA…☐; Tz…☐

Name of interviewee: _____

Name of organization: _____

Role in organization: _____

Duration of interview: initiated at ___h ___m; finished at ___h ___m. (Total = ____h ____m)

Consent form: provided...☐; signed…☐; collected…☐.

Introductory briefing

- This interview is part of the research work I am doing to obtain my doctoral degree. The purpose of my research is to examine the potential for cooperation between Tanzania and Mozambique and between Mozambique and South Africa in the joint conservation of shared marine natural resources.
- Through this interview I would like to understand your country's potential for cooperation in this type of initiatives.
- Your participation and any opinions you may share will be considered purely personal, even though I may query you on your organization's positions.
- I will not use a tape recorder to register your answers, and instead will take written notes.
- These and other aspects are explained in greater detail in this consent form. [Allow the interviewee to read through the consent form]
- Ask if the interviewee has any questions before starting the interview.

I – GENERAL QUESTIONS

1. Characterization of the organization (mandate, goals, resources, activities related to marine conservation and/or transboundary conservation, involvement with other organizations)

2. Has your organization ever participated in transboundary conservation initiatives?

3. If yes to 2, use interview script for type B actors before proceeding with the remaining of this interview.

I would like now to introduce another topic, concerning the position of your department/organization/institution in relation to the hypothetical cooperation of your country and a neighboring state in the conservation of shared marine resources. I ask you to consider that such cooperation would target in particular coral reefs and humpback dolphins. I will then first start by asking you some questions about coral reefs and humpback dolphins in particular.

[1] Institutions in each country that would be involved in leading a transboundary marine conservation initiative.

II – KNOWLEDGE OF THE RESOURCES AND ASSOCIATED INTERDEPENDENCIES

4. Coral reefs
    a. Is there any knowledge of the health of the coral reefs in your country being dependent on the health of coral reefs in the neighboring country, and vice-versa?
    b. What are the main threats to coral reefs in the region?
    c. Are you aware of any activity in the other country impacting on the coral reefs in your country? And vice versa?
    d. Are you aware of any activities of nationals of the other country in the coral reefs of your country? And vice versa?
5. Humpback dolphins
    a. Are there any records of humpback dolphins migrating between your country and the neighboring country?
    b. What are the main threats to humpback dolphins in the region?
    c. Are you aware of any activity in the other country impacting on the humpback dolphins in your country? And vice versa?
    d. Are you aware of any activities of nationals of the other country related to the humpback dolphins in your country? And vice versa?

I would like now focus on another issue. I will ask you now questions regarding the opinion of your department/organization/institution in relation to the hypothetical cooperation of your country and a neighboring state in the conservation of these shared marine resources.

III – CHARACTERISTICS OF THE ACTOR

6. What is the significance of coral reefs conservation for your department? (*ask about general or specific actions that target coral reefs*)
7. What is the significance of humpback dolphin conservation for your department? (*ask about general or specific actions that target humpback dolphins*)
8. What do you think the main goals of joint conservation of these resources in the concerned study area(s) should be? Can you elaborate?
9. In your opinion, what could be the effects of joint cooperation for the conservation of these resources on the goals of your department?
10. How do you think your department could contribute to that initiative? (*ask about experience, material means, etc.*)
11. In your opinion, would there be other governmental departments with a stake in this type of initiative? (*If yes*: What could their role/contribution be?)
12. Besides governmental departments, would there be any other organizations with a stake in the joint conservation of these shared marine resources? Can you elaborate on their potential roles and contributions?
13. Are there any other implications for your country of cooperating in joint conservation initiatives in that region?

In this final part of the interview, I would like to ask you to consider how the hypothetical cooperation in the conservation of coral reefs and humpback dolphins may be implemented.

IV – SCENARIOS FOR MARINE JOINT CONSERVATION

14. Consider that, among other measures, the two countries decide to create marine protected areas for the conservation of coral reefs and humpback dolphins. Which of these three scenarios seems more feasible to you (*show figures in the next page*)?
    a. Two marine protected areas on each side of the border, with each country responsible for all the management activities within its MPA;
    b. A single transboundary MPA, with each country responsible for all the management activities in its side of the MPAs;
    c. A single transboundary MPA, in which states share management responsibilities.

(*Give some time for the interviewee to analyze the three scenarios*)

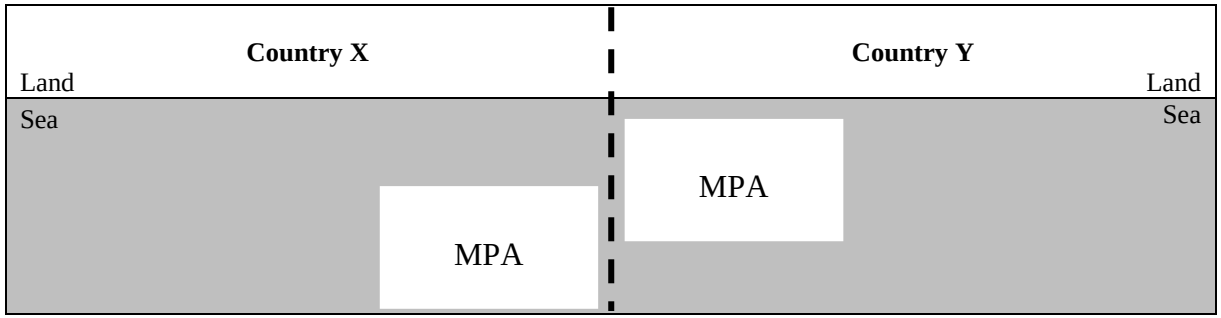
15. Can you elaborate on your choice by explaining what you think are the limitations and advantages of each option?

16. A new approach to marine conservation is the creation of networks of MPAs, that is, several MPAs in an area of the sea where there are important habitats and species. If a network of MPAs is shared between two countries, what implications do you foresee for the management of the network?

17. Should a network of MPAs address other issues, or should it focus only on the conservation of these resources? Why?

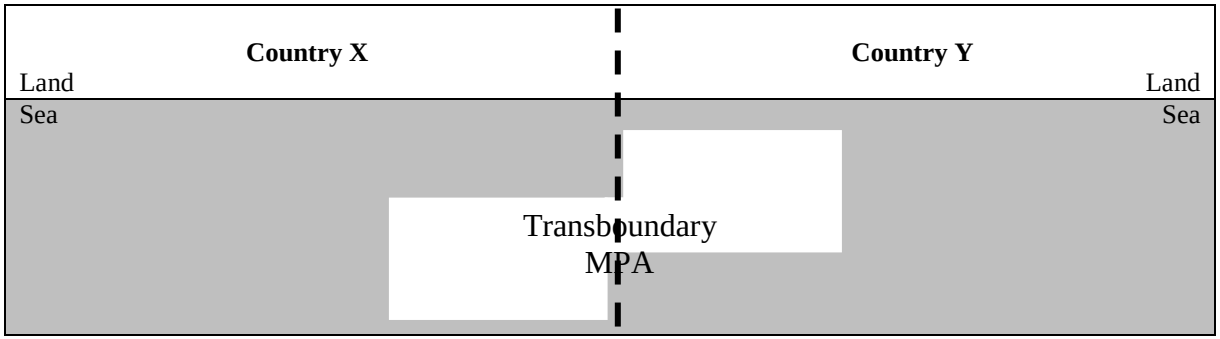
Closing debriefing

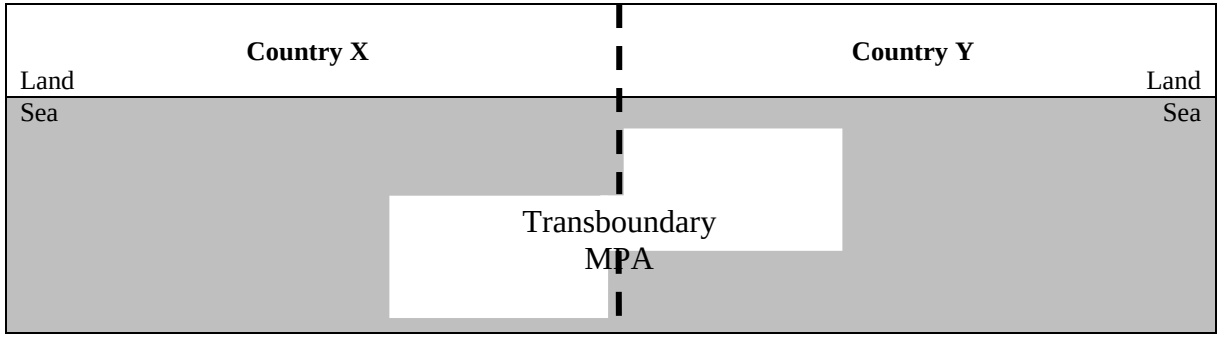
- *Mention some of the main points I have learned from interviewing this person. Allow the interviewee to give feedback on this.*
- I have no further questions. Is there anything else you would like to say or ask before we end the interview?
- Conclude by thanking for the cooperation.



SCENARIO A
Two MPAs on each side of the border, with each country responsible for all the management activities within its MPA.

SCENARIO B
A single transboundary MPA, with each country responsible for all the management activities in its side of the MPA.





SCENARIO C
A single transboundary MPA, with the countries sharing management responsibilities within the entire MPA.

INTERVIEW SCRIPT FOR TYPE B ACTORS[1]

Date: _____/_____/_____ Country: Mz…☐; SA…☐; Tz…☐

Name of interviewee: _____

Name of organization: _____

Role in organization: _____

Duration of interview: initiated at ___h ___m; finished at ___h ___m. (Total = ____h ____m)

Consent form: provided...☐; signed…☐; collected…☐.

Introductory briefing

- This interview is part of the research work I am doing to obtain my doctoral degree. The purpose of my research is to examine the potential for cooperation between Tanzania and Mozambique and between Mozambique and South Africa in the joint conservation of shared marine natural resources.
- Through this interview I would like to understand the role your country may have in this type of initiatives. I will ask questions about the organization you are a part of, and then about the organization's experience in transboundary conservation.
- Your participation and any opinions you may share will be considered purely personal, even though I may query you on your organization's positions.
- I will not use a tape recorder to register your answers, and instead will take written notes.
- These and other aspects are explained in greater detail in this consent form. [Allow the interviewee to read through the consent form]
- Ask if the interviewee has any questions before starting the interview.

I – CHARACTERISTICS OF THE ACTOR

1. Mandate, goals, resources, activities, involvement with other organizations. (ask for descriptive materials)

2. Before being involved in this transboundary conservation initiative (TCI), has your organization ever participated in other transboundary conservation initiatives?

3. If yes to 2., when, where and how? Role played by the organization?

II – EXPERIENCE IN THE TRANSBOUNDARY CONSERVATION INITIATIVE

Select the transboundary conservation experience in which the actor was involved:
Great Limpopo Transfrontier Park……☐
Elephant corridor between Selous and Nyasa Reserves…….☐

[1] Institutions/organizations with experience in transboundary conservation.

(if the interviewee or his/her organization was involved in both, ask questions separately for each transboundary conservation initiative)

4. What are the main goals of this TCI? (*ask for descriptive materials; if goals convey more than ecological concerns, ask to elaborate on their need*)

5. How did your organization become involved in this TCI?

6. What was your organization's role in this TCI?

7. How did your organization's participation in the TCI contributed to your organization's goals?

8. What other organizations and governmental departments were involved in the TCI?

9. How would you describe their role and functions in the TCI?

10. What is your opinion about the general success of this TCI? (*try to elicit the organization's concept of success*)

11. In your opinion, what were the positive aspects of this TCI? (*ask about centralization or decentralization of management, who has decision-making power, how management deals with unforeseen changes*)

12. Why do you think the TCI was successful in those aspects?

13. Do you think that there were negative aspects in the TCI as well? (*ask about centralization or decentralization of management, who has decision-making power, how management deals with unforeseen changes*)

14. Why do you think that happened?

I would like to introduce a third topic, concerning the motivations of the involved countries to cooperate in this TCI.

III – ACTOR'S PERCEPTIONS OF THE MOTIVATIONS TO COOPERATE

15. What do you think were your country's motivations to cooperate in this TCI? (*try to elicit motivations concerning capacity, advantages, disadvantages, and values; specify interdependencies*)

16. And what do you think the other country's motivations were? (*try to elicit motivations concerning capacity, costs and benefits, and values; specify interdependencies*)

I would like you now to consider the possibility of your country cooperating with a neighboring country in the conservation of shared marine resources through the creation of marine protected areas.

IV – ACTOR'S PERCEPTIONS OF MOTIVATIONS FOR FUTURE COOPERATION IN MARINE CONSERVATION

17. What advantages do you think your country would have in participating in such initiative?

18. And disadvantages?

19. What difficulties do you foresee in this type of initiative? (*technical/financial/human means; differences between the two countries*)

20. Considering your experience with the TCI mentioned before, what do you think should be done differently if the two countries are to cooperate in marine conservation? Or done in addition to what was done in the TCI?

21. And what should be done as in this TCI?

V – SCENARIOS FOR JOINT MARINE CONSERVATION

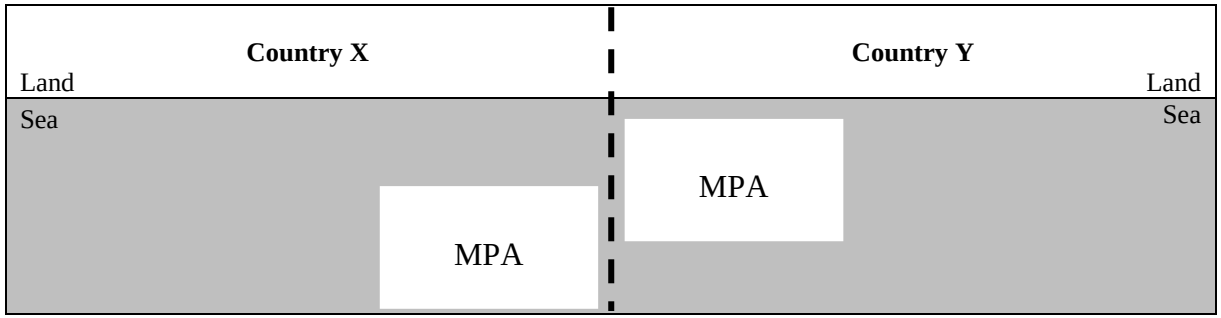
22. Consider that, among other measures, the two countries decide to create marine protected areas for the conservation of coral reefs and humpback dolphins. Which of these three scenarios seems more adequate to you (*show figures in the next page*)?
    1. Two marine protected areas on each side of the border, with each country responsible for all the management activities within its MPA;
    2. A single transboundary MPA, with each country responsible for all the management activities in its side of the MPAs;
    3. A single transboundary MPA, in which states share management responsibilities.

Give some time for the interviewee to analyze the three scenarios)

23. Can you elaborate on your choice by explaining what you think are the limitations and advantages of each option?

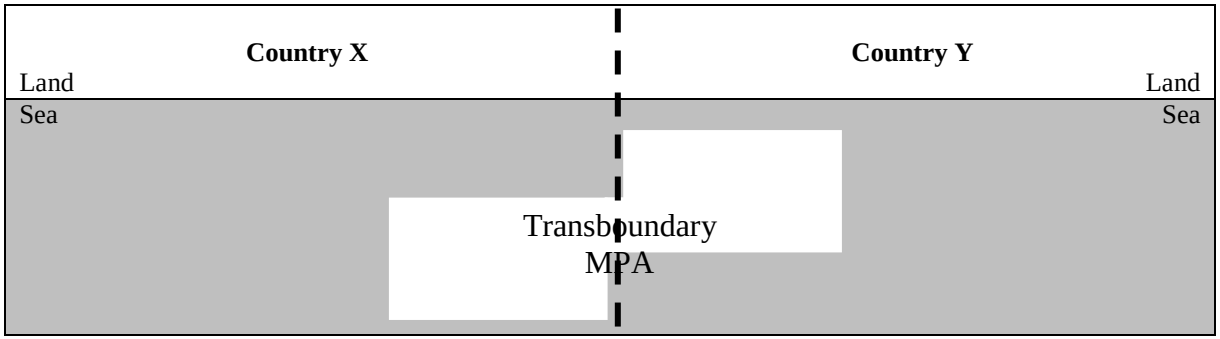
Closing debriefing

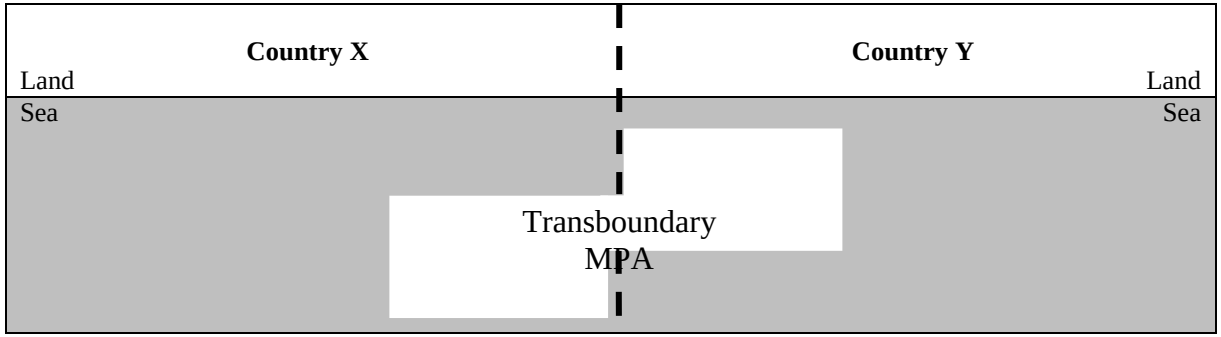
- Mention some of the main points I have learned from interviewing this person. Allow the interviewee to give feedback on this.
- I have no further questions. Is there anything else you would like to say or ask before we end the interview?
- Conclude by thanking for the cooperation.



SCENARIO A
Two MPAs on each side of the border, with each country responsible for all the management activities within its MPA.

SCENARIO B
A single transboundary MPA, with each country responsible for all the management activities in its side of the MPA.





SCENARIO C
A single transboundary MPA, with the countries sharing management responsibilities within the entire MPA.

INTERVIEW SCRIPT FOR TYPE C ACTORS[227]

Date: _____/_____/_____ Country: Mz…☐; SA…☐; Tz…☐

Name of interviewee: _____

Name of organization: _____

Role in organization: _____

Duration of interview: initiated at ___h ___m; finished at ___h ___m. (Total = ____h ____m)

Consent form: provided...☐; signed…☐; collected…☐.

Introductory briefing

- This interview is part of the research work I am doing to obtain my doctoral degree. The purpose of my research is to examine the potential for cooperation between Tanzania and Mozambique and between Mozambique and South Africa in the joint conservation of shared marine natural resources.
- Through this interview I would like to understand the role your country may have in this type of initiatives.
- Your participation and any opinions you may share will be considered purely personal, even though I may query you on your organization's positions.
- I will not use a tape recorder to register your answers, and instead will take written notes.
- These and other aspects are explained in greater detail in this consent form. [Allow the interviewee to read through the consent form]
- Ask if the interviewee has any questions before starting the interview.

I – GENERAL QUESTIONS

18. Characterization of the organization (mandate, goals, resources, activities related to marine conservation and/or transboundary conservation, involvement with other organizations)
19. Has your organization ever participated in transboundary conservation initiatives?
20. If yes to 2, use interview script for type B actors before proceeding with the remaining of this script.

I would like now to introduce another topic, concerning the position of your department/organization/institution in relation to the potential cooperation of your country and a neighboring state in the conservation of shared marine resources. I ask you to consider that such cooperation would target in particular coral reefs and humpback dolphins. I will then first start by asking you some questions about coral reefs and humpback dolphins in particular. These questions are therefore of a scientific or technical nature. Please let me know if you are not comfortable answering these questions.

[227] Institutions/organizations that may influence a state's motivation to cooperate in transboundary marine conservation.

II – KNOWLEDGE OF THE RESOURCES AND ASSOCIATED INTERDEPENDENCIES

21. Coral reefs
    a. Is there any knowledge of the health of the coral reefs in your country being dependent on the health of coral reefs in the neighboring country, and vice-versa?
    b. What are the main threats to coral reefs in the region?
    c. Are you aware of any activity in the other country impacting on the coral reefs in your country? And vice versa?
    d. Are you aware of any activities of nationals of the other country in the coral reefs of your country? And vice versa?
22. Humpback dolphins
    a. Are there any records of humpback dolphins migrating between your country and the neighboring country?
    b. What are the main threats to humpback dolphins in the region?
    c. Are you aware of any activity in the other country impacting on the humpback dolphins in your country? And vice versa?
    d. Are you aware of any activities of nationals of the other country related to the humpback dolphins in your country? And vice versa?

I would like now to focus on another issue. I will now ask you questions regarding the potential cooperation of your country and a neighboring state in the conservation of these shared marine resources.

III – CHARACTERISTICS OF THE INSTITUTIONAL ACTOR

23. What is the significance of coral reefs conservation for your organization? (*ask about general or specific actions of the organization concerning coral reefs*)
24. How do you think your country has been doing concerning the conservation of coral reefs? (*ask respondent for successes and failures*)
25. What do you think should be done differently or in addition to what has already been done? (*ask about viability of proposed options*)
26. What is the significance of humpback dolphin conservation for your organization? (*ask about general or specific actions of the organization concerning humpback dolphins*)
27. How do you think your country has been doing concerning the conservation of humpback dolphins? (*ask respondent for successes and failures*)
28. What do you think should be done differently? Or done in addition to what has already been done? (*ask about viability of proposed options*)
29. What do you think the main goals of joint conservation of these resources in the concerned study area(s) should be? Can you elaborate?
30. In your opinion, what could be the effects of joint cooperation for the conservation of these resources on the goals of your organization?

31. How do you think your organization could contribute to cooperation in the conservation of these resources? (*ask about experience, material means, etc.*)
32. Besides your organization, would there be any other organizations with a stake in the joint conservation of these shared marine resources? Can you elaborate on their potential roles and contributions?

IV – INFLUENCE OF INSTITUTIONAL ACTOR OVER STATE'S POSITION

33. Has your organization ever collaborated with any of these governmental departments before? In what? (*ask respondent to give examples*)
34. What did this partnership achieve that you think could not be achieved without your organization?
35. Has your organization ever advocated specific environmental policy directions to decision-makers? How?
36. Was the outcome of that advocacy what your organization expected? Why?
37. If your country was to cooperate in the conservation of shared marine resources, what would be your organization's preoccupation when communicating with decision-makers in that regard?

In this final part of the interview, I would like to ask you to consider how the hypothetical cooperation in the conservation of coral reefs and humpback dolphins may be implemented.

IV – SCENARIOS FOR JOINT MARINE CONSERVATION

38. Consider that, among other measures, the two countries decide to create marine protected areas for the conservation of coral reefs and humpback dolphins. Which of these three scenarios seems more adequate to you (*show figures in the next page*)?
    a. Two marine protected areas on each side of the border, with each country responsible for all the management activities within its MPA;
    b. A single transboundary MPA, with each country responsible for all the management activities in its side of the MPAs;
    c. A single transboundary MPA, in which states share management responsibilities.

(*Give some time for the interviewee to analyze the three scenarios*)

39. Can you elaborate on your choice by explaining what you think are the limitations and advantages of each option?

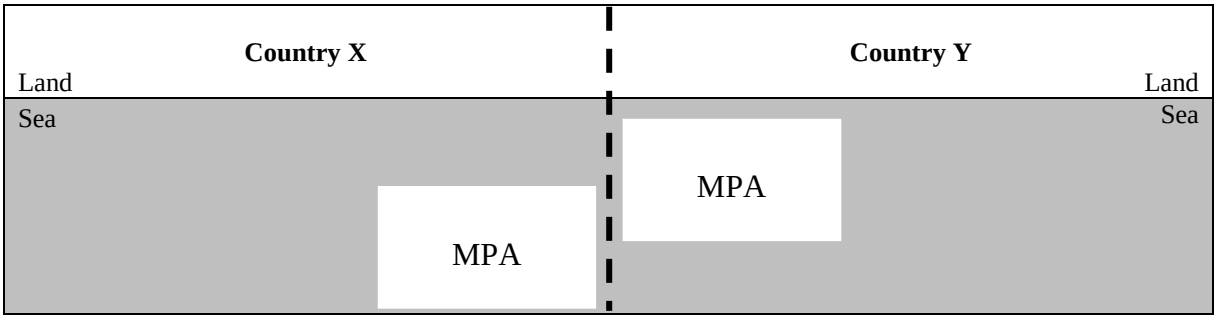
40. A new approach to marine conservation is the creation of networks of MPAs, that is, several MPAs spread in an area of the sea where there are important habitats and species. If a network of MPAs is created to protect coral reefs and humpback dolphins, and is shared between the two countries, what implications do you foresee for the management of the network?

41. Should a network of MPAs address other issues, or should it focus only on the conservation of these resources? Why?

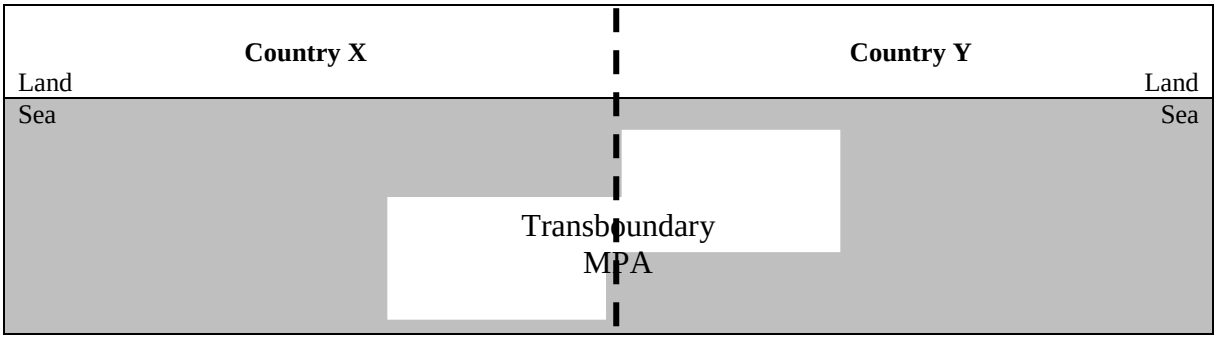
Closing debriefing

- Mention some of the main points I have learned from interviewing this person. Allow the interviewee to give feedback on this.
- I have no further questions. Is there anything else you would like to say or ask before we end the interview?
- Conclude by thanking for the cooperation.

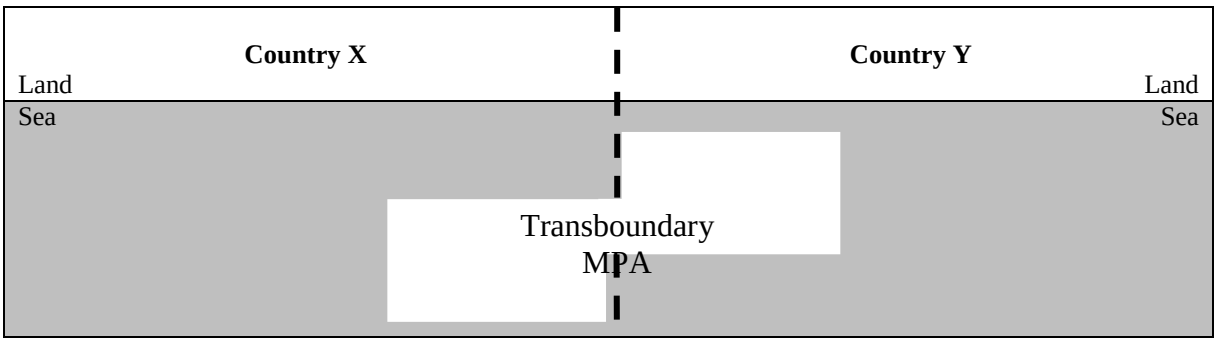
SCENARIO A: Two MPAs on each side of the border, with each country responsible for all the management activities within its MPA.



SCENARIO B: A single transboundary MPA, with each country responsible for all the management activities in its side of the MPA.



SCENARIO C: A single transboundary MPA, with the countries sharing management responsibilities within the entire MPA.



APPENDIX III – CONSENT FORM

Consent Form

TITLE OF RESEARCH PROJECT: Transboundary Networks of Marine Protected Areas: Governance Requirements in East Africa

RESEARCHER NAME: **Catarina Grilo**

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THE FOLLOWING IS PROVIDED FOR YOU TO CONSIDER PARTICIPATING IN THE PRESENT STUDY.

We invite you to take part in a research study being conducted by Catarina Grilo as part of her doctoral thesis in Marine Sciences at the University of Lisbon. Your participation in this study is voluntary and you may withdraw from the study at any time without affecting your relationship with the researcher, or with the University of Lisbon. The study is described below. This description tells you about the purpose and scope of the research. It also tells you of any risks, inconvenience, or discomfort you might experience by participating in the research. Participating in the study might not benefit you directly, but we might learn things that will benefit others. You should discuss any questions you have about this study with Catarina Grilo.

The purpose of this study is to understand if there is a potential for cooperation between Tanzania and Mozambique and between Mozambique and South Africa in the creation of transboundary networks of marine protected areas. It will also seek to investigate whether this potential for cooperation can be realized, and how.

The data to be collected concerns your personal knowledge about the transboundary region at stake and the potential for transboundary marine conservation. This information will be collected through an interview that **will not** be recorded. The researcher will take notes of your answers and insights. These notes will be used to create an interview report. If you do agree to participate in this study, you will be asked at a later point to collaborate in reviewing your interview report to ensure that the answers and insights you have given are appropriately stated.

You may participate in this study if: (i) you are affiliated with a governmental department that has a decision-making mandate for the purpose of transboundary marine conservation; (ii) you are affiliated with a governmental department or a non-state institution that does not have decision-making mandate for the purpose of transboundary marine conservation, but that may somehow be affected by it; (iii) you are affiliated with an organization (state or non-state) that has been previously involved in transboundary conservation initiatives in one of the three countries in question.

This study will be conducted by Catarina Grilo, under the supervision of Prof. José Guerreiro (FCUL, Portugal) and Prof. Aldo Chircop (Dalhousie University, Canada). Catarina Grilo will be the only person with access to the data, and the sole keeper of participants' anonymity and confidentiality. No risks and discomforts are expected from your participation in this research. You do not need to answer any question in regards to which you may feel discomfort. The potential risk of your statements being known to third parties will be minimized by ensuring that your name and affiliation is not associated to the files containing the information you will have provided, nor disclosed in any circumstance. This includes the interview report validated by you. Its content will most probably be used in the publication of several research articles, but your name or affiliation will not be mentioned (or any information that may lead to that) unless you provide written consent. All the information you may provide will be transcribed to electronic files, to be kept in a password-protected computer folder for at least five years. If the information you provided is critical to

substantiate my arguments, you will be asked whether your name can be mentioned. If you do not agree, your participation and contribution will remain anonymous, in accordance with this consent form.

Your participation in this research will not bring direct personal benefits to you. Still, you will have a singular opportunity to participate in a research study. Additionally, your insights are expected to contribute to the general knowledge of the advantages and limitations of transboundary networks of marine protected areas, an emergent form of cooperation in marine conservation.

Do not hesitate to ask any questions about the study either before participating or during the time that you are participating. I would be happy to share my findings with you after the research is completed.

Please sign your consent with full knowledge of the nature and purpose of the procedures. A copy of this consent form will be given to you to keep.

"I have read the explanation about this study. I have been given the opportunity to discuss it and my questions have been answered to my satisfaction. I hereby consent to take part in this study. However I realize that my participation is voluntary and that I am free to withdraw from the study at any time."

_____ _____

Signature of the Participant Date

_____ _____

Signature of the Researcher Date