

Multi- Stakeholder Perspectives on Coastal and Marine (Connectivity) Management in  
Dominican Republic

by

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### **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.  
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## Abstract

Large-scale connectivity conservation initiatives are increasing in prevalence as a variety of benefits are continually being demonstrated through these models, such as establishing and strengthening marine protected area (MPA) networks. The historical approach to solely establishing protected areas (PA) is no longer sufficient for achieving effective protection and often does not include comprehensive and holistic management plans involving multiple perspectives. This thesis presents findings from research in the Dominican Republic (DR) where numerous components of coastal and marine social-ecological systems are addressed, including: status of large scale connectivity initiatives; governance structure inclusion of local resource users; and explore alternative livelihood opportunities.

Data was acquired by conducting 35 key informant interviews achieved via snowball sampling with multi-scalar and cross sectoral coastal and marine stakeholders, ranging from the community level to high levels of government in the DR. After conducting interviews and evaluation of current and future large-scale marine conservation initiatives in the DR, current limitations and future opportunities for natural resource management were identified. The trend of ineffective small scale initiatives indicate that the management of individual parks or conservation projects need to be functioning smoothly (i.e. using best practices) prior to establishing larger scale conservation initiatives. Furthermore, there is ample opportunity for multiple sectors to be involved to aid the transition from extractive livelihoods in the Dominican Republic, such as destructive fishing practices, towards low impact and environmentally responsible opportunities. Findings from this study contribute to further understanding complex coastal systems, while considering management implications on local communities and ecosystems in the Dominican Republic. Recommendations from the research support a diverse governance structure of stakeholders from across sectors and multiple scales within the DR coastal and marine sector, to ensure priorities from all types of resource users are included in conservation management initiatives. Implications of this study further support the shift to inclusive governance frameworks that may contribute to increased compliance in the case of protected area legislations, boundaries knowledge, understanding local environmental challenges, and stewardship for coastal and marine resources. All these aspects help provide the appropriate institutional framework to ensure social connectivity, and ultimately assist the integration of local communities into a more sustainable and healthy relationship with nature.

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## Acronyms and abbreviations

AZE: Alliance for zero extinction  
CBC: Caribbean Biological Corridor  
CBD: Convention on Biological Diversity  
CBF: Caribbean Biological Fund  
CCI: Caribbean Challenge Initiative  
CEBSE: Center for the Conservation and Eco-development of the Samaná Bay and its Environment  
CEP: Caribbean Environment Programme  
CITES: Convención sobre el Comercio Internacional de Especies Amenazadas de Fauna y Flora  
CLME: Caribbean Large Marine Ecosystem  
CODOPESCA: Consejo Dominicana de pesca y agricultura  
CLME: Caribbean Large Marine Ecosystem  
EA: Ecosystem Approach  
EBM: Ecosystem Based Management  
EEZ: exclusive economic zone  
EU: European Union  
FAO: Food and Agricultural Organization  
GEF: Global Environment Facility  
ICM: Integrated Coastal Management  
JBE: Jaragua Bahoruco Enriquillo  
LMR: Living Marine Resources  
MaB Committee: Man and the Biosphere Committee - Dominican Republic - (UNESCO)  
MDG: Millennium Development Goals  
MOE: Ministry of Environment  
MOA: Ministry of Agriculture  
MOT: Ministry of Tourism  
MPA: Marine Protected Area  
NGO Non-Governmental Organization  
LMR: Living Marine Resources  
PA: Protected Area  
SPAW: Specially Protected Areas and Wildlife  
SINAP: National System of Protected Areas  
SIDS: Small Island developing states  
SINAP: Sistema Nacional de Áreas Protegidas  
TNC: The Nature Conservancy  
UNEP: United Nations Environment Program  
UNDP: United Nations Development Program  
UNESCO: United Nations Educational, Scientific and Cultural Organization  
WWF: World Wildlife Fund  
WCR Wider Caribbean Region

## **Chapter 1: Introduction**

### **1.1 Context**

The Caribbean region is primarily comprised of island nations, many of which are SIDS (Small island developing states), which consider coastal and marine resources as extremely valuable to the socio-economic and biological functions of their nations. Coastal and marine based conservation initiatives are important to protect coastal and marine resources for both human use and ecosystem resilience. This research focuses on the Dominican Republic (DR), a biodiversity hotspot whose social, economic, and political structure allows for great opportunity to succeed with conservation goals. Two important components of conservation success are: 1) the effective management of (protected areas) PAs, and; 2) participation in large-scale connectivity initiatives (e.g. Caribbean Challenge Initiative, Caribbean Biological Corridor). The DR's natural environment contributes to the foundation of the tourism industry, national gross domestic product (GDP), livelihoods of the country's inhabitants, and the biodiversity of the region (Reynoso, 2011). Through presidential agreements the DR has created an extensive network of protected areas totaling approximately 21.5% of its total territory including the EEZ (MMARN, 2014). Additionally, the benefits of protected areas and connectivity initiatives include, preserving biodiversity and ecosystem services, adapting to climate change impacts, allowing for long term protection of natural resources and threatened species, and supporting the transition into more resilient coastal communities.

### **1.2 Research Rationale**

This thesis seeks to address several current gaps in the research on effectiveness of marine conservation initiatives in the Caribbean, specifically, MPAs and large-scale connectivity initiatives that are more likely to contribute to increased ecosystem resilience (Foley et al., 2010). Research is lacking with regards to connectivity considerations for effective long-term coastal and marine ecosystem protection. Nor can I find examples of research on the ability of governance systems to adapt to new and large-scale connectivity initiatives (Magris et al., 2014). However, various research attempts to quantify the effectiveness of MPAs to evaluate progress towards both global and regional protection targets is currently a focus area in coastal and marine conservation management (Wood et al., 2008; Spalding et al., 2013). This study explores multi-stakeholder perspectives from one country's coastal and marine conservation efforts in order to attempt to gain further insights on why, specifically, coastal and marine ecosystems continue to degrade as commitments and MPA establishment increases. In general, the current system in which PAs and conservation initiatives are managed needs to change in order to better manage for connectivity, for effectiveness (Cicin-Sain and Belifore, 2005; Edgar et al., 2014) and for multi stakeholder priorities (Arceo et al., 2013; Chuenpagdee et al., 2013).

### **1.3 Gap in the Literature**

Recent studies suggest that coastal and marine protection is more effective when a broad range of stakeholders is involved, including local resource users (Chuenpagdee et al., 2013; Arceo et al., 2013). Specifically, a gap in the literature is identified within decision-making effectiveness in conservation and associated governance structures (e.g. within coastal and marine networks and initiatives). Additionally, studies show that a shift to considering connectivity within coastal and marine ecosystems is needed for management, in lieu of establishing and managing protected areas in isolation (Roberts et al., 2001; Fanning et al., 2009a; Knowles et al., 2015; Phillips, 2003; Cicin-Sain and Belifore, 2005; Edgar et al., 2014).

This thesis addresses a gap in the literature stated previously by examining who is involved within the decision-making process and the perspectives on a variety of stakeholders with interest in coastal and marine resources within the DR at different scales. Studies show In order to efficiently secure marine natural resources for the future; the knowledge and concerns of coastal community stakeholders must be considered to ensure effective protection, regulation compliance and ultimately successful long-term management (South to South Cooperation, 2011). From the diverse perspectives of coastal and marine stakeholders, I will gain insight into how natural resource users interact, and identify barriers/opportunities for achieving effective protection and management within these social-ecological systems.

### **1.4 Research Objectives**

This thesis examines coastal and marine conservation management, specifically MPAs and large-scale coastal and marine connectivity initiatives, in the Dominican Republic in terms of effectiveness and inclusion of local resource users. Initially, I focused on current state of coastal and marine systems and a literature review on the transition to a new way of managing protected areas and large-scale conservation initiatives. Then, through fieldwork and interviews, insights were integrated into the governance structure and decision making process within the coastal and marine network. Finally, I examined the opportunities and challenges within the current conservation commitments in the Dominican Republic from the view of multiple stakeholders across different scales. Specific research objectives are listed below as this study aims to:

*Objective 1:* Examine governance frameworks in order to assess the degree to which local resource users are considered in the decision-making process for natural resource management, specifically coastal and marine conservation management such as MPAs and large-scale coastal and marine connectivity initiatives.

*Objective 2:* Identify potential opportunities within social-ecological systems to reduce undesired livelihood impacts from conservation efforts such as the establishment of marine and coastal PAs.

*Objective 3:* Assess perceptions of biodiversity conservation via conservation connectivity initiatives that reflect the Dominican Republic's commitment to increasing ecosystem protection.

*Objective 4:* Identify the challenges and opportunities to achieving sustainable coastal and marine resource use in the DR.

## **1.5 Thesis Structure**

This thesis is structured to address the research objectives previously listed through a mixed methods approach, which includes key informant interviews and quantitative analysis. 35 Interviews were conducted in the Dominican Republic to address current literature gaps and suggestions from previous studies. Research rationale in Chapter 1 is followed by a literature review in Chapter 2 of 1) coastal and marine systems; 2) systems approaches to conservation, and; 3) implications of governance for conservation effectiveness. Chapter 3 involves a review of relevant characteristics of the study site for this studies research in Dominican Republic. Chapter 4 provides a research framework for the study, highlighting the approach, techniques and data analysis, and additional research considerations are outlined. Chapter 5 presents the results through 5 different lenses: considerations for management; current and future projects; governance frameworks; challenges; and recommendations for effective conservation/management. Chapter 6 discusses the main findings presented in chapter 5 in relation to the initial research objectives stated in chapter 1, as well as discusses research outcomes and further research needs. Finally, Chapter 7 concludes the thesis by examining how the results contribute to the advancement of knowledge in coastal and marine decision-making and management processes.

## Chapter 2: Literature Review

### 2.1 Coastal and Marine Systems

#### 2.1.1 Benefits<sup>1</sup>: Why Conserve?

Coastal and marine systems provide a wide range of benefits and functions to both humans and the environment (Angulo-Valdes and Hatcher, 2010). Many species living in coastal and marine areas rely on the services provided by these environments, either directly or indirectly (Angulo-Valdes and Hatcher, 2010). Ecosystem services include: water, food, timber, nutrient cycling, photosynthesis, regulation of climate and floods, water quality, recreational and cultural values (UNEP, 2008). Additional benefits of coastal and marine areas are for human wellbeing; these include coastal tourism, trade and shipping, offshore oil and gas and fisheries (UNEP, 2008). Fisheries especially play an important economic, subsistence, and cultural role in the Caribbean (Fanning et al., 2009a). There are many additional known benefits of MPAs, Angulo-Valdes and Hatcher (2010) for example, identifies a total of 99 specific benefits categorized under humans and nature.

In order to protect these ecosystems and services, MPAs<sup>2</sup> are valuable tools for the conservation and sustainable use of biodiversity (SCBD, 2004). Further rationale for establishing marine protection, likely MPAs, for these valuable ecosystems exist beyond those of ecological value such as, enhancing non-consumptive opportunities, as well as expanding knowledge and understanding of marine systems (Sobel, 1996).

#### 2.1.2 Current Status and Trends

The current status of initiatives, global targets, and degradation of coastal and marine resources specific to the Caribbean will be discussed here. Between 1970 and 2010, marine species have declined 39% globally, with more than 75% of the Caribbean Sea currently threatened of marine habitats and species 'heavily affected' by human activities in the Caribbean (Juffe-Bignoli et al., 2014). The Caribbean, which contains a significant percentage of key biodiversity areas, has experienced unprecedented change and impacts on coastal and marine habitats (Birdlife International, 2010; UNESCO, 1997).

In recent years there has been a range of initiatives for stakeholders, both globally and in

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<sup>1</sup> Benefits and ecosystem services information provided in this section will be primarily from studies within the Caribbean, and when appropriate may be linked with the study site of Dominican Republic.

<sup>2</sup> In this thesis, the use of 'MPA' will be inclusive of the various types of MPAs such as Marine Management Areas, No-take fishery Reserve, Marine and coastal protected area.

the Caribbean, focusing on the protection, rehabilitation and conservation of coastal and marine resources. For example, as a part of Aichi Target 11 under the Convention on Biological Diversity, nations worldwide agreed to protect at least 10 percent of coastal and marine areas by 2020. It is suggested that countries should first identify areas of importance for biodiversity and ecosystem services, and unlike most other global targets, Target 11 states that areas should be managed equitably and effectively and integrated into management of the wider seascape (SCBD, 2014; Leadley et al., 2014). Progress towards this goal indicates that at least 10% of coastal and marine areas are conserved under the Aichi Target 11 definition (Leadley et al., 2014). Other general targets relating to sustainable use of natural resources such as millennium development goals (MDG) #7 works towards ensuring environmental sustainability by integrating sustainable development into national policies and programs (UN SIDS, 2014).

At a global scale, MPA management effectiveness is generally low; however, documents containing MPA principles and effectiveness guidelines are consistently being reformed and released (Kelleher, 1999; UNEP, 2011; Edgar et al., 2014). Only 1.6% of the world's coral reefs are adequately managed, and from this no more than 0.1% are within no-take marine reserves that are well enforced (Mora et al., 2008). Dr. Heredia, an Integrated Coastal Management (ICM) expert in the DR expressed the growing recognition of the urgency for conservation and sustainable management of marine resources both within her country, and globally (Heredia and Martinez, 2013). This integrated management is necessary as there are infinite ways coastal and marine ecosystems can be negatively affected by human actions (Schelhas et al., 2002).

### 2.1.3 Threats and Vulnerabilities

Marine systems are affected by both natural and anthropogenic impacts and activities, and are vulnerable to a wide variety of disturbances that have environmental and economic implications. Coastal and marine resources in the Caribbean have become significantly depleted over the past 10 years. Marine habitats such as estuaries, mangroves, wetlands, seagrasses and coral reefs, are the systems thought to be in need of the most protection from unregulated and poorly managed use and development (Miller, 1991; Millennium Ecosystem Assessment, 2005) as they are extremely vulnerable systems. Habitat fragmentation and destruction (from tourism), land and ship-based pollution, and development (from industrial and urban sources) are major threats to biodiversity in the Caribbean region, including the Dominican Republic (Wielgus et al., 2010). These disturbances interrupt environmental processes and have resulted in various noticeable negative environmental impacts, which often have socio-economic consequences (Allison, 2009). Even though tourism in Caribbean countries is important economically, tourism-related activities are responsible for many societal and environmental changes (Miller, 1991; Williams, 2008; Uzzo, 2013). Perhaps most notably in the last decade, reef-dependent

fisheries have experienced a drop of 60% of gross income (Weigel et al., 2014), and increased erosion has been seen in many beach areas. These factors threaten the tourism industry and in the case of beach erosion, may cause revenue losses up to 52-100 million US dollars between 2010-2020 for the Dominican Republic hotel industry (Wiegus et al., 2010).

Human related threats are well known within the Caribbean, and are currently being exacerbated through cumulative effects from other intensified anthropogenic activities and changing climactic patterns (Allison, 2009). Healthy coastal and marine systems can assist in mitigating these negative impacts (Quataert et al., 2015; Fanning et al., 2009a), and the connectivity between habitats such as mangroves, seagrass beds and reefs may influence the system's ability to recover from disturbances (Grober-Dunsmore and Keller, 2008). In order to adapt to these threats and increase resilience of coastal and marine systems, an integrated and holistic approach is seen as necessary component for managing complex social-ecological systems (Schelhas et al., 2002; Steneck, 2009; SCBD, 2004).

## **2.2 Systems approach to conservation**

The introduction of ecosystem-Based management (EBM) strategies such as marine protected areas (MPAs) can be extremely beneficial for humans and nature, if appropriately established (Christie et al., 2009). These benefits can be extensive, including, but not limited to: improving fishery yields, increasing predator populations, enhancing non-consumptive opportunities, protecting ecological processes, providing educational opportunities and restoring depleted populations (Angulo-Valdes and Hatcher, 2011). It has been suggested that a balance between the biological, economic, social and political factors of a community must be achieved before a management initiative can be successful. Participation by all resource users and stakeholders is necessary throughout the creation and management process of MPA's, from scientists, fishermen<sup>3</sup> and tour operators to governmental bodies and the general public (Beddington et al., 2013).

### **2.2.1 Connectivity: Why important?**

There are many reasons why connectivity is an important consideration in marine planning and management. This section reviews the concept of connectivity and connectivity conservation within the marine context, and explores how to ensure the success of initiatives and managing for connectivity. Determining the right scale for coastal and marine

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<sup>3</sup> The use of 'fishermen' instead of 'fishers' was chosen to use throughout this thesis as 'fishermen' was the common used term from the key informants and the literature. It was not intended to be a gender exclusive term. Additionally, there were no women who were fishers that were encountered or heard of throughout the study.

management is challenging, however, there are benefits to managing ecosystems/resources at a large scale (Grober-Dunsmore et al., 2009; Wyborn, 2011; Le Corre et al., 2012). By considering connectivity when designing and implementing conservation initiatives, the complex and dynamic nature of marine ecosystems can more effectively be taken into account (Le Corre et al., 2012; Roberts et al., 2001). Connectivity in the coastal and marine context can be defined in several ways. Ecologically, connectivity refers to the exchange of materials such as nutrients or pollutants, organisms or genes, often driven by currents and movement patterns (Grober-Dunsmore and Keller, 2008). The term can also refer to a landscape (seascape)-scale approach, or the functional associations (i.e. spatial arrangements) among habitats and species populations (Wyborn, 2011; Olds et al., 2012). One useful definition of landscape connectivity is ‘the degree to which the landscape facilitates or impedes movement [of species] among resource patches’ as defined by (Taylor et al., p.570, 1993). Finally, applying these concepts to large-scale marine conservation initiatives allows for the inclusion of entire ecosystems within a region, rather than establishing protection in isolation (Phillips, 2003; Cicin-Sain and Belifore, 2005; Edgar et al., 2014).

Connectivity conservation is the “big thinking response” that has emerged to face current complex environmental challenges (Worboys, 2010). It involves using both biodiversity and social dimensions to create actions that conserve land/seascape, habitat, ecological, and evolutionary processes (Worboys, 2010). Connectivity conservation is increasingly being acknowledged as an important component for designing and planning marine conservation initiatives, such as in PAs (Grober-Dunsmore and Keller, 2008, Pittman et al., 2014). The usual basis for establishing marine protection has been to conserve biodiversity, protect critical habitat and ensure resources for the future. However, marine species such as marine mammals, large pelagic fish, invertebrates and reef fish usually require more than one habitat or geographic space throughout their life history. Connectivity in the marine realm may require looking at management from a larger scale due to many species, such as invertebrates like mollusks and lobsters, whose larvae often travel into other nations’ waters (Roberts, 1997; Knowles et al., 2015). Many reef species require connectivity between coastal and marine habitats for different life stages. During their juvenile stage reef species inhabit shallow coastal waters and rely on mangroves and seagrass habitats for protection and a nursery before returning back to the reef for adulthood (Olds et al., 2012; Pittman et al., 2014). Finally, marine megafauna and large pelagic and reef fish such as humpback whales, Nassau Grouper and sea birds travel long distances through many nations exclusive economic zone (EEZ) and boundaries for migration reasons which may include mating, calving, or food sources. Migratory species often hold a role as keystone species, which are crucial to overall ecosystem functioning and thus function as indicators of ecological change (Roff and Zacharias, 2011).

Hess and Fischer (2001) state that large-scale conservation efforts, such as corridors, usually perform more functions than the initial intended function of maintaining biodiversity and other ecological benefits (Crooks and Sanjayan, 2006) such as facilitating connectivity. For example, taking a larger-scale systems approach to coastal and marine management can help mitigate natural resource exploitation that can occur outside park boundaries when MPA's are managed in isolation (Cicin-Sain and Belifore, 2005). Therefore, planning for connectivity allows for a wider geographic range to be accounted for so species can move between habitats, and protected areas (Leadley et al., 2014). Additionally, this holistic view of marine systems allows coastal and marine managers to prepare for uncertainty, as species' ranges may shift due to climate variability in the future (Olds et al., 2012). In the face of uncertainty and climate change, conservation success is important as many human and financial resources are involved in coastal and marine conservation initiatives. The management of areas beyond marine conservation areas such as MPAs helps achieve a larger scale approach to management, and is necessary to facilitate the health of populations across habitats (Steneck, 2009). Lastly, ensuring the effectiveness of conservation initiatives and avoiding the establishment of isolated MPAs can mitigate the exploitation of marine resources outside park boundaries (Cicin-Sain and Belifore, 2005). All these listed considerations contribute to the effectiveness of marine conservation initiatives (Leadley et al, 2014).

Despite advances in MPA management (e.g. ecosystem-based approaches, systems perspectives), progress has been slow in linking reserves and marine protected areas (MPAs) into larger managed areas, using for example, integrated coastal management (ICM), zoning, biospheres, and biological corridors as tools, (Magris, 2014). One reason for this is that threats and disturbances often exist outside the boundaries of MPA's and therefore seascapes outside MPA's are not the focus of managers (Grober-Dunsmore and Keller, 2008). Although including connectivity concepts into marine resource planning and management involve increased complexity, such an approach informs decisions and can contribute to overall effectiveness of marine conservation efforts such as MPAs (Grober-Dunsmore et al., 2009; Olds et al., 2012). Furthermore, when marine connectivity is a factor during the initial process of design and selection of marine conservation initiatives and areas, reserve performance as well as overall ecosystem resilience may be enhanced considerably (Olds et al., 2012).

### 2.2.2 Tools for Connectivity Conservation

There are a wide variety of tools (i.e. strategies, approaches, mechanisms), which can contribute to successful connectivity conservation within marine systems. Over the past decade or so, there has been a wide interest in investing in large scale conservation

strategies, generally referred to as connectivity conservation, in order to protect species and habitats, as well as ecosystem services provided by these ecosystems (IUCN, 2007). To ensure a holistic view is taken, the goals of ecosystem-based management (EBM) are often used when applying connectivity conservation approaches as it often improves ocean resource management (Christie et al., 2009). Large scale marine-specific strategies for implementing EBM include marine spatial planning and integrated coastal management (ICM), both of which use a systems perspective to sustainable resource use (Aswani et al., 2012). Approaches and tools commonly referred to as “protected areas systems or networks”, “biodiversity corridors”, “biosphere reserves”, “ridge to reef”, and “protected area (PA) networks” are examples of large scale connectivity strategies (IUCN, 2007; Almany et al., 2009; GEF, 2011; UNESCO, 2013) . Although such approaches are already significantly advanced for terrestrial protected areas, the same is not true for their marine equivalents (Almany et al., 2009). In general, there is a general lack of connectivity within the currently established and reported protected areas in the coastal and marine realm (Juffe-Bignoli, 2014). There are many mechanisms and tools needed for the implementation of large-scale connectivity conservation, because management becomes increasingly complex as you move from terrestrial environments to marine environments (Christie et al., 2010). Additionally, social, political, and environmental factors vary between nations and require a large toolbox of strategies in order to select the most appropriate action (see Figure 1).

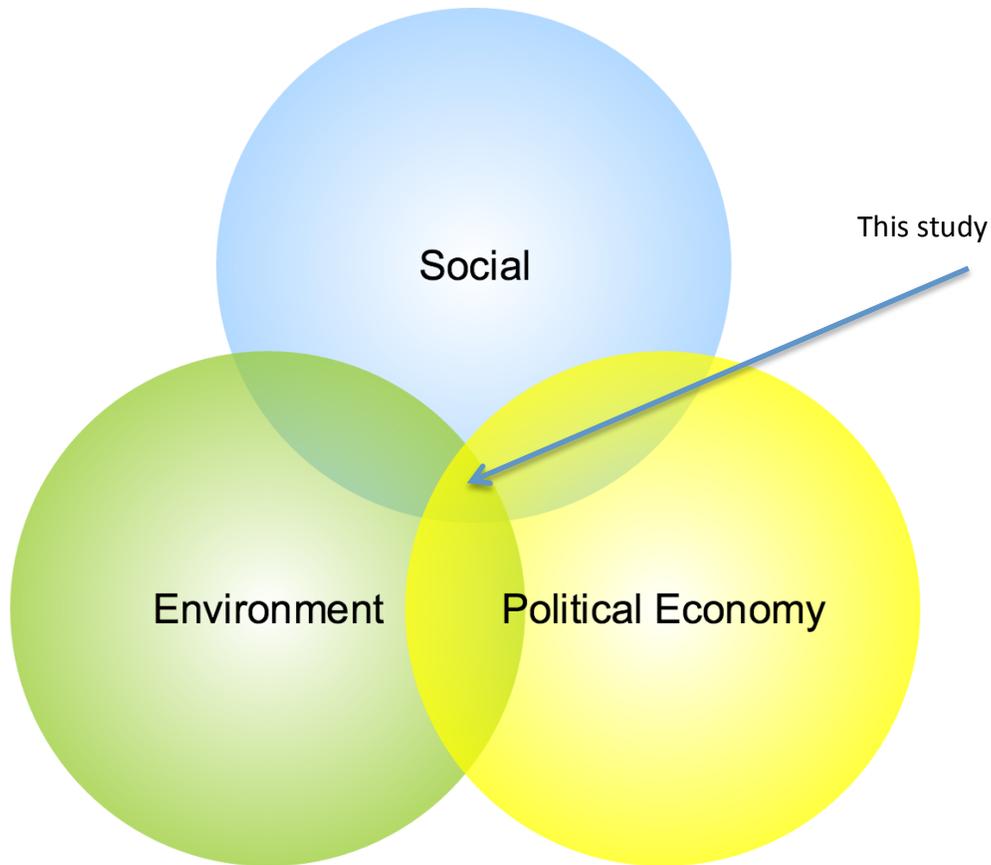


Figure 1: Humans are now being treated as part of the natural system when developing management plans for coastal and marine conservation efforts. This study is situated within the intersection of the three dimensions.

### 2.2.3 History of MPAs

An early definition of MPA was defined as “any area of intertidal or subtidal terrain, together within 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.”(Kelleher, 1999, p. xi). A more current definition by the IUCN is 'A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values' (Day et al., 2012, p.12). MPAs is a general term for the main objective of biodiversity conservation (sanctuary, reserve, park), these areas can perform many different functions which incorporate a variety of priorities suited to context-specific needs. Varying levels of protection are listed in Appendix A by the

IUCN that can be implemented through different regulation and management techniques (Kenchington and Kelleher, 1995).

Historically there have been 3 ways to approach marine conservation: regulation and management of individual marine activities; creation of small marine protected areas; and to establish many large protected areas which allow multiple uses within their boundaries (Kenchington and Kelleher, 1995). More recently, the evolution of MPAs and marine conservation has been based on complex factors such as development, resource extraction, tourism which were thought to have led with the overexploitation and pollution concerns that became more apparent in the early 1980's -1990's. As previously mentioned, MPAs lack the integration of connectivity principles and priorities into their establishment and management aspects is a limitation of current coastal and marine conservation (Phillips, 2003; Cicin-Sain and Belifore, 2005; Edgar et al., 2014). However, general successes include coastal and marine conservation initiatives shifting to recognize humans within the natural system, so both human and ecological conservation objectives can be achieved (Phillips, 2003; Juffe-Bignoli et al., 2014). Additionally, research is moving beyond species-specific management and looking at connections between ecosystems- species.

#### 2.2.4 New Paradigm for Conservation Management

Linked social-ecological systems, including humans with nature, and inclusion of a broad range of stakeholder perspectives, are three key factors when planning and managing marine conservation initiatives effectively: social, environment, political economy (see Figure 1). Continuing from the theme of EBM in marine conservation, a recent movement to including humans as part of natural systems management is increasingly being found as a common goal among MPA managers (Phillips, 2003; UNEP, 2011; Bustamante et al., 2014). This means that the scale of focus and management considerations have broadened in conservation. In order to achieve conservation objectives, a shift to a more inclusive form of management, which considers social systems in addition to ecological processes, has been seen in PA management (Schelhas et al., 2002; Long et al., 2015). This approach, referred to as the 'new paradigm' in 2003, includes a more broad way of looking at protected area management by including a diverse range of actors/stakeholders (Phillips, 2003). This "broad way" involves a model that considers local people, partnerships, large scale, long term management, and is planned within a protect area system or network (Appendix A). There are many types of inclusive management approaches that include the characteristics of 'the new paradigm', for example participatory management, co-management and the involvement of multi-scalar and cross sectoral stakeholders. Recent research by Rodriguez-Rodriguez et al. (2015) suggests that Marine protected areas (MPAs) are increasingly regarded as socio-ecological systems and in addition to their reported ecological affects, MPAs may have important social, economic and cultural effects on local communities and

marine and coastal stakeholders (see Figure 2). Many conservation studies and projects have focused on establishing and managing areas of “sustainable use” based on new paradigm principles to balance the needs of society with environmental integrity (Kooiman and Bavinck, 2005). A relatively successful example of a large-scale conservation initiative is the Mesoamerican corridor in Central America. This multi-national effort includes both ecosystem -based management and connectivity principles, as well as attempts to integrate ecological and social priorities over a large scale (Worboys, 2010).

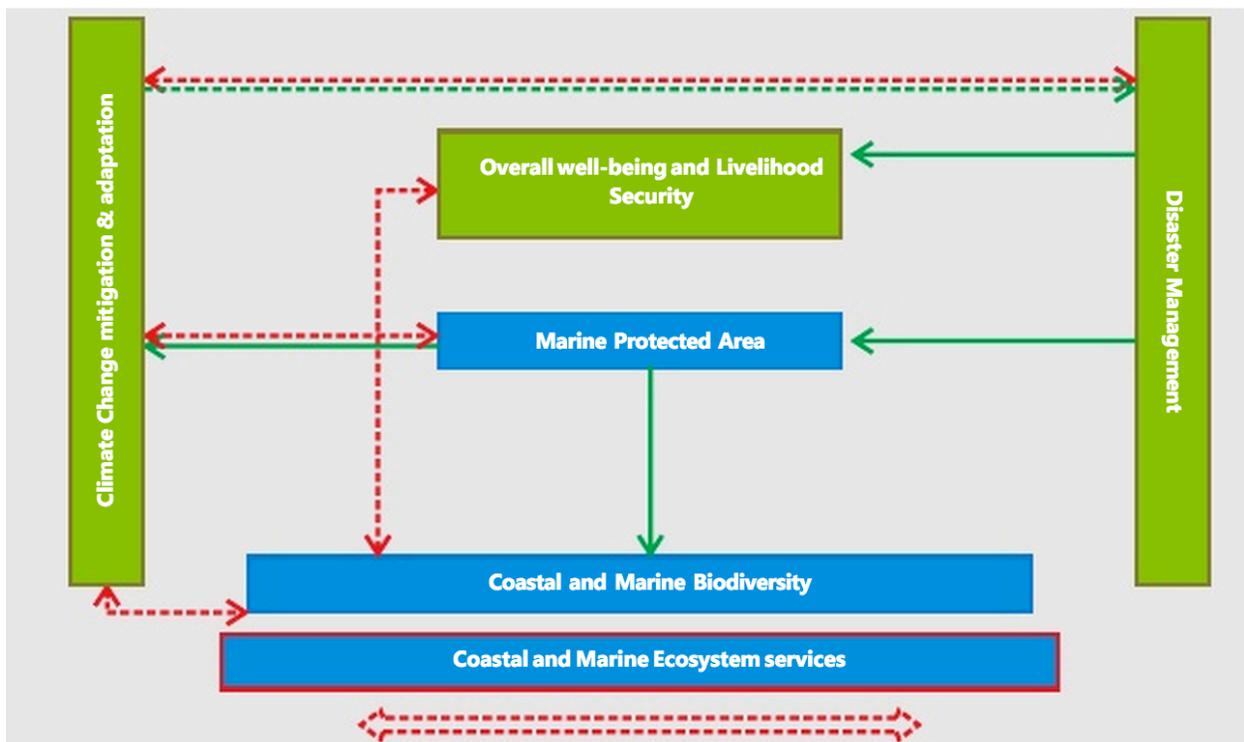


Figure 2: Overview of synergies and tradeoffs of marine and coastal protected areas and their interconnections (Khera, 2014)

Figure 2 highlights the principles behind the ecosystem-based approach also account for the ecological, social, and economic considerations for natural resource management (i.e. partnerships and citizen participation, science based approach, long term goals, comprehensive perspective) (Slocombe, 1998; Phillips, 2003). Effective strategies for marine conservation require the inclusion of social factors in order to ultimately be successful (Christie et al., 2009).

### **2.3 Implications of Governance for Conservation Effectiveness**

Recently, governance arrangements have been recognized as important for ensuring that conservation efforts are designed, implemented, and managed effectively (Steneck, 2009). Large-scale connectivity conservation initiatives, especially in marine cases, are often not bound by country borders, and require transboundary collaboration and partnerships between nations and within regions (Chakalall et al., 2007). This can be a challenge, especially in the Caribbean since the region has been described as “the most geographically and politically diverse and complex region in the world” (Mahon et al., 2009; Fanning et al, 2009a, p.261). With the many binding and non-binding international agreements there exists incentives for nations to increase coastal and marine protection. However, much of the protection agreements and initiatives have not been effective (Juffe-Bignoli et al., 2014). Achieving effective coastal and marine protection often requires an inclusive, multi-stakeholder approach to decision making (Fanning et al., 2013; Mahon et al., 2013))(see Box 1.0). In the case of coastal and marine conservation efforts, such as protected areas and large-scale connectivity initiatives, it is important to include local stakeholders throughout the process (Andrade and Rhodes, 2012; Lopes et al., 2013). Therefore, engaging stakeholders across sectors and over multiple scales is generally seen as a key factor when planning successful protection measures. Furthermore, inclusive governance arrangements and participation of diverse multi-scale stakeholder groups can result in clear benefits and are likely to yield high levels of compliance, and are ultimately more likely to be effective in managing living marine resources (Pollnac et al., 2010; Andrade and Rhodes, 2012; Lopes et al., 2013). Within the broad topic of MPA governance, there are a few notable characteristics to consider: power, scale, and collaboration.

**Box 1.0: Selected definitions of governance and management as they relate to environmental conservation.**

<u>Concept</u>	<u>Definition</u>
Governance	<p>“Governance is the structural, institutional, ideological, and procedural umbrella under which development programs and management practices operate” (Bennett and Dearden, 2014, pg. 99).</p> <p>Governance may refer to a few different concepts: 1) a set of arrangements, broader processes and institutions such as public–private partnerships, through which decisions are made in regards to the environment, “ It can also be used as an analytical lens to understand how to achieve conservation outcomes.” (Armitage et al., 2012, p.246).</p>
Inclusive Governance	<p>As it’s concerned for this study, inclusive governance refers to the recent increased prominence for governance structures and arrangements that attempt to include stakeholders other than the traditional centralized government, such as non-centralized and non-governmental institutions and organizations. Example of inclusive governance approaches include multi-level or multiscalar governance, participatory governance (e.g. bottom-up approaches, co-management arrangements</p>
Management	<p>Management involves day to day operational-type decisions in order achieve particular conservation outcomes (Oakerson 1992; Armitage et al., 2012). This includes participatory approaches to govern natural resources.such as co-management and using bottom-up approaches.</p>

### 2.3.1 Power

As previously mentioned, there can be many different institutional and stakeholder arrangements for planning and implementing marine conservation initiatives, and each of these treat the issue of power differently. Central governments may not always have conservation as a main priority, but by allowing other stakeholders to play leadership roles more inclusive governance structures are evolving and power is being shared. Collaborative structures for resource management often involve legally sharing responsibilities and power (Worboys, 2015). This is considered to be the devolution of power and decision making

from the central government (top-down regime) to another stakeholder group, also known as decentralization or bottom-up governance models. Such shifts of responsibilities empower other stakeholder sectors, and encourage stewardship of the shared marine resources being managed (Wondolleck and Yaffee, 2000).

The devolution of power to the community level, commonly referred to with such labels as 'community involvement', 'grassroots or bottom-up approaches', 'community-based management' or 'co-management', are increasingly recognized approaches that contribute to effective conservation management including: long term sustainable marine protection (Pollnac et al., 2010). Successfully attaining MPA goals is continually being linked with the use of such power-sharing approaches, as the coastal communities are engaged in the governance process, and is represented as a local stakeholder alongside various legal authorities (Arceo et al., 2013; Chuenpagdee et al., 2013). Additionally, studies have shown that integrating community participation and collaboration throughout the entire marine PA planning and management process is imperative for long-term success of a marine management strategy (Dukes et al., 2011; Chuenpagdee et al., 2013).

### 2.3.2 Scope and Collaboration

The effectiveness of governance arrangements for coastal and marine ecosystems is influenced by both scope and scale of the initiative and the collaboration and participation of stakeholders. Multi-scale solutions that recognize regional differences in governance (e.g., centralized power structures vs. those more receptive to stakeholders and local traditions) and result in clear benefits for stakeholders are likely to have higher compliance (McClanahan et al. 2006) and be more effective at responding to the extremely variable nature of coral reef ecosystem connectivity and inclusive, multi-scale solutions (Steneck, 2009). Scaling up conservation protection has its challenges; especially in marine environments as many of the resources are transboundary, but also many benefits. For example, in the Caribbean, the most pressing rationale for a governance arrangement at the regional scale lies in the many transboundary marine and ecological linkages within the Wider Caribbean (Spalding and Kramer, 2004). This will require collaboration between nations to facilitate effective governance, or as concisely stated by a UNEP presentation title: "Ecological connectivity facilitated through institutional connectivity". This highlights the importance that regional experts have placed on the role of governance to address ecosystem based governance issues in the Wider Caribbean Region (Fanning et al., 2009a; Mahon et al., 2009). For example, a study by Chakalall et al. (2007) evaluated institutional arrangements for governance (IAG) of trans-boundary resources, in coastal and marine systems, which revealed weak or lacking governance systems in the Wider Caribbean. Due to the trans-boundary nature of marine resources, Chakalall et al. (2007) emphasizes the need for collaboration for governance to be effective. Additionally, a study by Thrush et al. (2015) agrees with this transition to include social considerations when developing conservation strategies and management plans:

“We aim to facilitate the transition to a more trans disciplinary framework, and move beyond the fisheries-focused management. Human pressure is increasing, and many ecosystems are affected by cumulative impacts from different sources of disturbance. We advocate for a development of participatory multi-sector management that integrates different institutions to contribute to cultural, social, economic, and biodiversity values for ocean governance.” - (Thrush et al., 2015, p.1)

## **2.4 Summary**

Resource managers will need to use large-scale ecology principles and connectivity concepts and tools in order to move from focusing on individual habitats or patches and manage ‘mosaics’ of coral reef habitat both within and beyond MPA boundaries (Grober-Dunsmore et al., 2009). In order to accomplish these marine conservation goals over large scales, as well as increasing effectiveness, a new typology of management that is inclusive of social systems, multi-scalar governance, collaboration between stakeholders, and appropriate institutional arrangements for decision-making will be key (Brondizo et al., 2009; Chakalall et al., 2007; Jones, 2013; Rodriguez-Rodriguez et al., 2015).

## **Chapter 3: Study Site Context**

### **3.1 Dominican Republic Background**

Dominican Republic (DR), along with Haiti, makes up the island of Hispaniola, which is part of the Greater Antilles eco-region along with Cuba, Jamaica, and Puerto Rico. Due to the country's high level of environmental commitment, and to favorable logistical, linguistic and research permission reasons, the Dominican Republic was chosen as the site for this study. This thesis will argue that the DR's social, economic, and political structure allows for great opportunity to succeed with conservation goals, such as achieving effective protection of PAs, and participating in large scale regional conservation connectivity initiatives. The inclusion of coastal and marine based initiatives within conservation is important because marine ecosystems are extremely valuable to the socio-economic and biological functions of many Caribbean islands, including the DR. These coastal and marine environments contribute to the foundation of the tourism industry, national GDP, and livelihoods of the country's inhabitants, as well as the biodiversity of the region. In this chapter I review the political, social-economic, and biological characteristics of this shared-island nation.

### **3.2 Political Characteristics**

The democratic history of the DR began in 1961 when there was a shift from an authoritarian system of government to a more democratic system, which fostered a transition into more environment-focused policies. As seen in Figure 3, the DR has experienced a varied degree of authority trends. Currently, three political parties have had varying influence over the span of 15 years as environment of legislation advanced. However, "democracy remains weak due to the high degree of power concentrated in the hands of the President and because the constitution provides only limited constraints on the actions of the Government" (Marshall, 2013, p.2). Notable environmental success has been made through the establishment of the Ministry of Environment in 2000 under law 64-00 where dozens of other environmental rights and legislations for coastal and marine areas have been enacted. Especially, Sectoral law 202-04 for protected areas 202, and Decree No. 571-09 after which 34 new protected areas (including marine areas, wetlands, mangroves, dry forest, coastal lagoons, etc.) were added to the National System of Protected Areas (SINAP) (Reynoso, 2011). Legal and institutional mechanisms for environmental protection have been created recently, and environmental advocacy and consciousness are growing throughout the country (USAID, 2005).

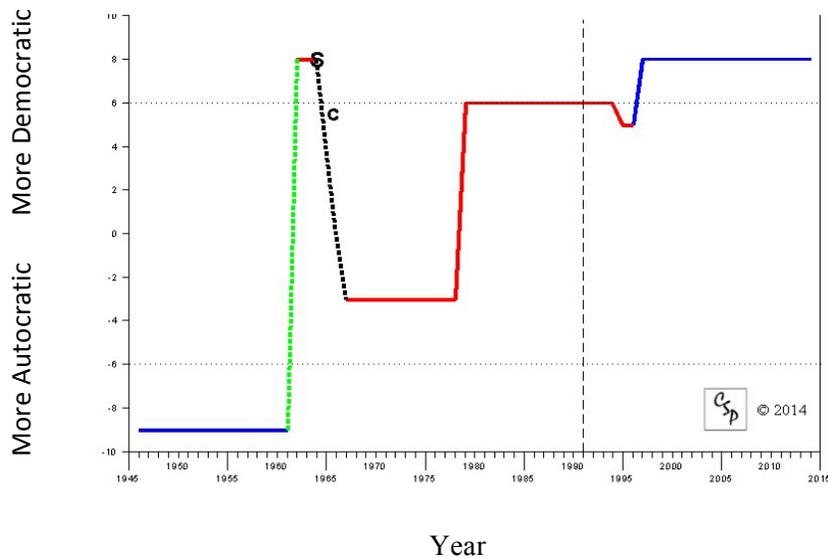


Figure 3: This polity graph demonstrates the DR's transition towards a democratic system over the past 70 years (1946-2013), with the recent years (blue) in full democracy (Marshall, 2013).

### 3.3 Social-Economic Characteristics

#### 3.3.1 Population, Poverty and Development

DR is the second most populated island in the Caribbean at 9.6 million (215 people per square km of land area in 2014), which has placed pressure on environmental resources for subsistence and economic development, and in turn affected poverty levels throughout the country (see Figure 4)(World Bank, 2015). Populations have significantly increased in the past 40 years with poverty rates hovering around 40-50% since 2004 (World Bank, 2015). With the prediction that the population trend will to continue to rise from 10.4 million in 2014 to 13.2-14 million in 2050 (CIA, 2014; Population Reference Bureau, 2014), there exists a need to integrate Dominican economic development mechanisms with poverty reduction and environmental conservation, and with all three components being considered within the same system (DREDE, 2015).



Figure 4: An industrial salt operation in the Monticristi coastal zone, an area once covered in mangroves (UNEP, 2013).

### 3.3.2 Main Economic Industries

The Dominican Republic is a middle-income country, with a fast growing economy over the past few decades; unfortunately activities such as resource extraction and coastal development have contributed to negative impacts on coastal and marine systems. Being among the 10 largest economies in the Caribbean, the DR has a 5% average economic growth rate which is largely dependent on coastal and marine systems (World Bank, 2015). Economic industries that affect coastal systems directly or indirectly, with associated GDP contribution, include aggregate mining (sand and gravel), salt production, deforestation, fishing (multi-scale), agriculture (bananas and coconuts, top crops, sugar and cacao products) and tourism (UNEP, 2013). Many of the extractive industries exist in the terrestrial regions of the DR, and yet still have impacts on marine systems through land-sea connectivity via river, runoff and reduction of habitat. Other land-based industries such as mining (bauxite, cement, iron, gypsum, limestone, marble, and nickel) and deforestation (wood charcoal for fuel wood) have also been linked with negative marine impacts (FAOSTAT, N.D.).

The central government places high value on coastal and marine industries and services, with 75% of industries located in the coastal and marine zone (World Bank, 2010). Accordingly, the DR depends heavily on tourism which accounts for 37% of total export earnings and 15% of GDP (WTTC, 2009; Mateo and Haughton, 2004). Along with the tourism



industry, DR inhabitants traditionally engage in subsistence harvesting such as agriculture and fisheries, which contribute 11.5% and 0.5% to national GDP, respectively (Worldbank, 2010). Furthermore, being the second largest island in the Greater Antilles with 48,670 km<sup>2</sup> of coastline, the DR has an exclusive economic zone (EEZ) of 269,285 km<sup>2</sup> (van der Meer et al., 2014). The EEZ is where the country has the sovereign right to “explore and exploit, conserve and manage living and non-living resources in the water column and on the seafloor” (see Figure 5) (Zeller and Pauly, 2015), p.2. The listed economic activities and development priorities within the DR are closely tied to the health of coastal and marine environments.

Figure 5: The EEZ of the DR (van der Meer et al., 2014).

### 3.3.3 Fishing Activities in the Dominican Republic (DR)

Fish is an important source of protein for DR locals, and both fishing as an activity and fish as a product is an important part of many local and touristic experiences in the DR. Not only is fishing important for livelihoods of many Dominican families, but is also important culturally as many people consider fishing a family tradition (Herrera et al., 2011). Ninety-eight percent of the fishing activity within the DR is small scale and artisanal with approximately 9000 registered fishermen and 3,300 boats (UNEP, 2013; ACP Fish II, 2013). These small-scale fisheries are subsistence-based or local, featuring small markets, and generally use traditional fishing techniques with small non-motorized boats, or boats with small outboard engines (Silva, 2003; Herrera et al., 2011). Fishing data has been compiled over the years from numerous projects in differing regions of the country from a myriad of both national and international organizations whereas fishing activities are currently monitored and enforced by CODOPESCA (Ministry of Agriculture), the navy and the Ministry of Environment and Natural Resources (ACP Fish II, 2013). Most fishing efforts in the DR occur in <30m depth resulting in high fishing pressure on seagrass, algae and reef ecosystems; however, as overfishing depletes near shore fisheries, fishermen are moving deeper to reach new pelagic populations (Salas et al., 2011). Primary harvesting methods include skin diving, spear, traps, hand-line, gill nets, trawling, long lines, fish aggregating devices (FAD), and hooka (Ruiz, 2012; Herrera et al., 2011). There is no recent documentation of fishing using explosive devices or poisons, and the collection of species for the aquarium trade has declined in recent years. The majority of species caught (targeted or non-targeted) are considered for consumption with only a few species being sold in small-scale commercial market (such as jacks, herring juvenile sharks, and snapper) (Ruiz, 2012). The fishing industry in DR has developed rapidly in the past few decades resulting in an increase in quantity of boats, along with the establishment of sport fisheries. Additionally, recreational fishing is becoming increasingly popular as tourists hire local fishermen to go sport fishing; however, there is current debate whether or not sport fishing is a sustainable alternative livelihood for locals opposed to extractive commercial fishing (Herrera et al., 2011; Wood et al., 2013).

Despite growth within the sector, the fishing industry remains a common-pool resource that, overall, is poorly regulated, monitored and researched with widespread overfishing and poaching due to high demand from the tourism industry (Herrera et al., 2011). The highest consumption of marine species occurs within the tourism market, where it is consumed fresh in country. Fish are also imported into the country to satisfy the demand left unfilled by DR's domestic fisheries, as the fishing industry remains largely undeveloped commercially (Herrera et al., 2011). Particular species in high demand from the DR population and visitors, in terms of the volume and value of catch, queen conch (*Strombus gigas*) and lobster (*Panulirus argus*). These species are the two main target species in Dominican Republic fisheries that have shown a significant decline from 2000 on even

though the volume of fish landings continue to grow (Zeller and Pauly, 2015; Herrera et al., 2011). This is due to non-targeted or indiscriminate fishing where small and non-traditional species are caught. This type of fishing is unsustainable as populations are often unable to reach a reproductive age before being caught, and populations are unable to recover (Herrera et al., 2011).

### 3.3.4 Relations with Haiti: Conservation challenges in the Hispaniola border zone

Due to the geographical and ecosystem linkages between DR and Haiti, there are increased pressures on coastal and marine environments with associated opportunities to collaborate on conservation initiatives. Protection of ecosystems varies in these nations due to a difference in social, economic and political characteristics (Figure 6). Persistent problems in

the marine areas of the border zone mainly involve fishermen crossing borders to go fish, usually Haitians moving into DR waters, as there is increased opportunity in DR given the depleted condition of Haiti's fisheries (UNEP, 2013). These problems are also found in marine protected areas near the border region. Additionally, lack of enforcement leads to lack of compliance by local fishers with regulations in MPA's and for seasonal closures, which results in the increased pressure, typically Haitians harvesting marine species within and at park boundaries (UNEP, 2013). Poaching of marine turtles, manatees and fish species exist in some communities in DR, along with violations of lobster and conch season (Mateo and Haughton, 2004). Over the past 5 years the Ministry of Environment of each respective country have been increasingly coordinating and trying to collaborate more on environmental initiatives. When regulated and monitored, UNEP identifies that *"Trade in marine species across the border is important and a clear opportunity for increased cooperation in the border zone."* (UNEP, p.85, 2013).



Figure 5: Protected Areas in the Haiti DR border zone (UNEP, 2013; Birdlife International, 2010).

### 3.3.5 Tourism in the DR

Picturesque coastal and marine habitats are often what tourists venture towards, and therefore, such ecosystems are often very interconnected with the tourism industry. Being the most visited island in the Caribbean<sup>4</sup> (CTO, 2009), the tourism sector in the Dominican is dependent on clean beaches, pristine water and healthy coral reefs (Reef Check, ND; Reynoso, 2011). A current concern is from coastal and marine tourism as this sector has tremendous potential to transform the natural environment and society both quickly and permanently (Miller, 1991; Heredia and Martinez, 2013). For example, tourism has transformed the growth of the service sector and promoted the migration of local populations to areas within the country with tourist areas (Uzzo, 2013). A very small focus of the country's tourism industry is ecotourism, a form of tourism that allows local resource owners to gain revenue through non-consumptive use of habitats, and to protect local ecosystems. Ecotourism can often be a positive strategy to encourage environmental sustainability through biodiversity conservation (The International Ecotourism Society, 2009). However, the larger focus of DRs tourism market has been almost exclusively on mass tourism, particularly all-inclusive tourism, which involves moving a large number of visitors, likely through fragile coastal habitats, over a short period of time (Wielgus et al., 2010; Reynoso, 2011).

Although the Ministry of Tourism seems to promote ecological based destinations, a formal strategy or legislative focus on responsibly incorporating the environment and/or consideration of local communities does not yet exist in the Ministry of Tourism mandate (Dominican Republic Tourism Ministry, N.D.). Current coastal and marine tourism areas that could be developed more responsibly<sup>5</sup> include Samana (Los Haitises, Marine Mammal Sanctuary), and Monticristi, Bayahibe (NP del Este). Massive all inclusive tourism regions are Punta Cana, La Romana, Puerto Plata (Cabarete), Santo Domingo (Ruta, 2003). Developing these areas responsibly would be important to “strengthen the participation of local communities in the decision-making process, create awareness on the political, environmental and social climates of the host countries, and provide direct financial benefits for conservation” (DREDE, 2015, para. 3).

The DR tourism industry faces many environmental challenges, beginning from the initial stages of development, which often results in the following: coastal ecosystem destruction, reduction of water availability (for sewage and drinking water) and the lack of adequate disposal systems for solid waste (Ruta, 2003). Coastal and marine resources will continue to

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<sup>4</sup> Excluding cruise ship passengers

<sup>5</sup> In this study, responsible tourism is broadly to incorporating social, economic and environmental considerations into tourism management and practices. I prefer responsible opposed to “sustainable” to avoid pre-conceived notions and specific views on particular definitions.

receive increased pressure as all inclusive (mass) coastal tourism grows. Specifically within the areas seen in Figure 7, coastal and marine environments contribute to the foundation of the tourism industry, national GDP, livelihoods of the country’s inhabitants as well as the biodiversity of the region. However, there are social benefits and income opportunities for local people to become employed for tourism agencies within tourism destinations in DR. Particular positive benefits such as increased household income and higher levels of job satisfaction in rural areas (Leon, 2004).

### 3.4 The Caribbean and the Dominican Republic: Biological Hotspots

The Caribbean islands are considered to be a ‘biodiversity hotspot’ (see Figure 8) and the recent census of marine life has reported at least 12,000 indigenous species, plus an additional 120 invasive species (COML, 2010). Within the last decade, numerous large-scale projects have attempted to unite Caribbean nations to focus on various aspects of marine systems to prevent further depletion of highly valued resources, maintain ecosystem services, and ensure a healthy environment for future generations. These projects include the Caribbean Challenge Initiative (CCI), Caribbean Biological Corridor (CBC)(which is specific to 3 countries the Western Antilles region), and Caribbean Large Marine Ecosystem (CLME). Despite these initiatives, “a significant percentage of Caribbean key biodiversity areas are inadequately protected and managed” (Birdlife International, p.23, 2010). This statement relates to inadequate coverage of protection, under-representation of ecosystems and habitats, and weak, ineffective protected area management.



Figure 6: Location of Coral reefs and selected tourist destinations in Dominican Republic (Wielgus et al., 2010).

The Caribbean is known as a ‘biodiversity hotspot’ due to the abundance of freshwater, terrestrial and marine biodiversity, and contains a vast amount of critical habitat for endemic species. The total area in the DR covered by PAs (58,331.64 Km<sup>2</sup>) is made up of 45,890.22 Km<sup>2</sup> of marine protected area (MPA) and 12,441.42 Km<sup>2</sup> terrestrial area (MMARN, 2014). As per the Critical Ecosystem Partnership (Birdlife International, 2010), the DR has 35 key biodiversity areas (290 total spread across 25 islands), the second highest in the region after Jamaica. A total of 209/290 of these biodiversity areas include coastal and marine ecosystem and 2/209 are considered “Wholly Irreplaceable Sites in the Caribbean Islands Hotspot” (Birdlife International, 2010, p.13). These 2 “irreplaceable” sites are found in DR: DR’s Parque Nacional Jaragua; and Los Haitises (Birdlife International, 2010, p.13). Additionally, there are numerous Alliance for Zero Extinction (AZE) sites (i.e. the most urgent site-level conservation priorities on a global scale) within DR. These high ranking AZE sites within the DR are particularly important for conservation due to the presence of very high numbers of critically endangered and endangered species. The DR ecosystems support approximately 2,000 species of marine fauna, such as: sea anemones; sponges; jellyfish; crabs; shrimps; fish; turtles; and whales, many of which are endangered (Herrera et al., 2011).

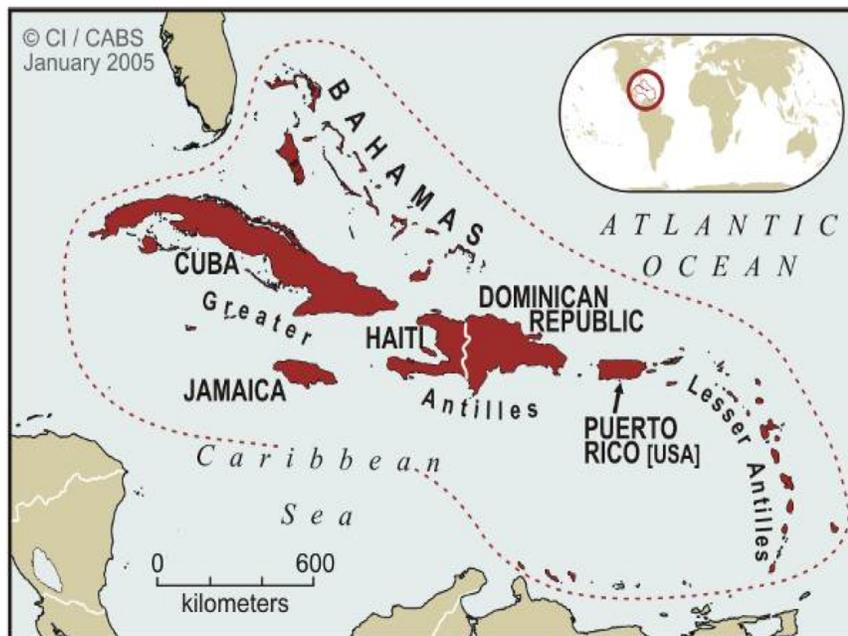


Figure 7: Map of the Caribbean islands hotspot (Birdlife International, 2010).

The DR has strived to achieve representative protection of their various ecosystems through large-scale collaborative projects. This is accomplished through projects like Protected area

gap analyses conducted by the TNC, and through effective management of these areas through other agreements (see International Agreement section). Despite these efforts, compliance and enforcement issues still exist; Heredia and Martinez (2013) states that currently, the 1,576km coastline of DR is highly affected by human threats.

### **3.5 Large Scale Conservation Strategies**

The large-scale conservations strategies and initiatives introduced within this section are cases which involve both social and connectivity features. These cases will be examined throughout the study to identify some of the challenges (or failures) associated with MPA management as mentioned previously in section 2.2.3. Additionally, information regarding each of the cases will occur through secondary literature and current perceptions will be identified through the key informant interviews and will be further critically analyzed in the results section.

#### **3.5.1 Dominican Republic's National System of PAs**

The Vice Ministry of Protected Areas, created under the 64-00 and Vice Ministry of Biodiversity is the body responsible for coordinating the Dominican Republic National System of Protected Areas (SINAP) (See Appendix A for mission statement and responsibilities). Protected Areas are used as a legislative and management instrument achieved through presidential decree for conservation and development in the DR, and thus can have different management arrangements and levels of protection (Worboys et al., 2015). The level of protection for PAs in the DR use the IUCN Categories, a breakdown of which can be found in Appendix E. The SINAP was declared by presidential decree No. 571 in 2009 and presently consists of 123 Protected areas (Reynoso, 2011). These areas cover approximately 46,669 km<sup>2</sup> of coastal marine areas throughout the country, 33 of which have marine components (Reynoso, 2011). The SINAP covers approximately 21.75% of DR's territory and is seen as a significant accomplishment for a Small Island Developing State (SIDS) (see system details in Figure 9) (MMARN, 2014). This high level of protection has been accomplished from the groundwork provided by previous governments by a small network of committed individuals. Many involved with international non-governmental organizations (NGO), who are primarily responsible for DR's image, as "a paragon of environmentalism" (Holmes, 2010, p.624).

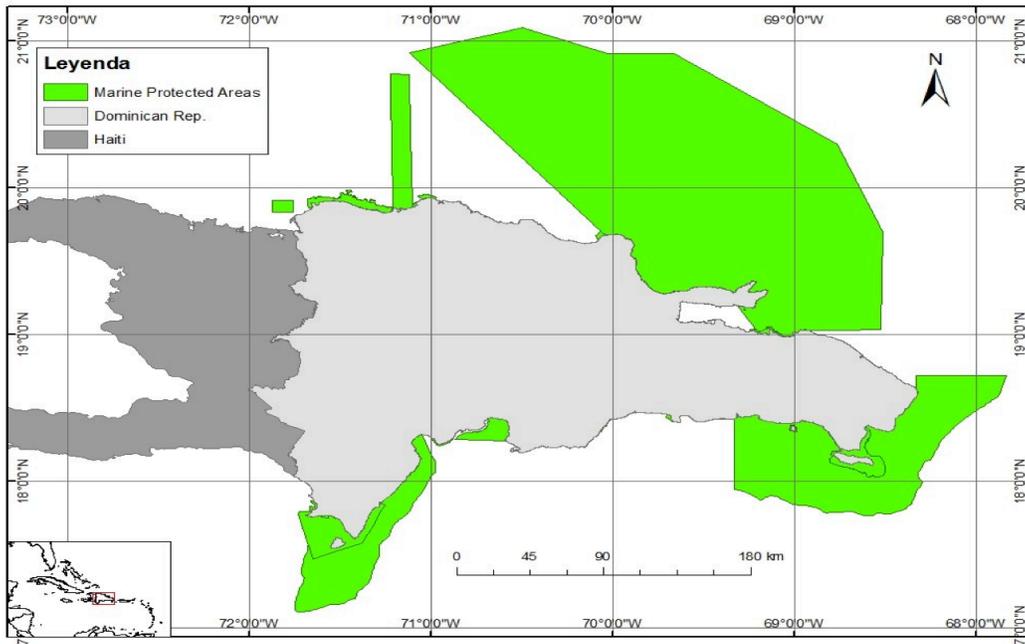


Figure 9: Map of Marine Protected Areas in the DR SINAP (Reynoso, 2011).

### 3.5.2 Conservation Financing

The DR's environmental legislation, LAW 64-00, provides both administrative and funding instruments for environmental and natural resource management. For example, the National Fund for Environment and Natural Resources (MARENA Fund) develops financial resources to support nation wide goals of "protection, conservation, research, education, restoration, and sustainable use" (Reynoso, p.7, 2011). The budget for the MOE is partially derived from royalties and grants from exploration/exploitation of natural resources, fines from violations, and donations (Reynoso, 2011).

## 3.6 Multi-national efforts

### 3.6.1 Massif de la Selle – Jaragua –Bahoruco – Enriquillo Binational Corridor

This particular corridor area, straddling Haiti and Dominican Republic, totals 9324km<sup>2</sup> of area, with a high level of coastal and marine connectivity (Figure 10) (Birdlife International, 2010). A brief description of each area is given here. The Jaragua-Bahoruco-Enriquillo (JBE) Biosphere Reserve, established November 6, 2002, was the first biosphere reserve designated in the DR. The JBE Biosphere Reserve covers most of the southwest of the country, and includes a core area, buffer zone, and transition zone. The reserve also contains three national parks with distinctive habitats in both marine and terrestrial ecosystems. Jaragua National Park, established in 1983, has extensive marine areas under protection including many notable islands and cays. Lake Enriquillo National Park,

established in 1974, incorporates a notable highly saline lake that is below sea level. Lastly, Bahauc National Park, also established in 1974, includes tropical highlands that are considered to be critical bird conservation habitats. The South West region of DR supports a population of 360,000 inhabitants, while only 1443 people live within the buffer zone. Due to the lack of accessibility and basic services, and presence of dense forests and poor quality soils, there are no permanent inhabitants within the core area of the JBE Biosphere Reserve with the exception of only a few mobile fishing camps within Jaragua National Park (Grupo Jaragua, 2006). Prior to the establishment of the biosphere reserve, the forests were at risk from human encroachment and deforestation with 15% of all forests within the reserve destroyed between 1996-2003 and poaching of turtles and eggs were common (Rupp, 2013).

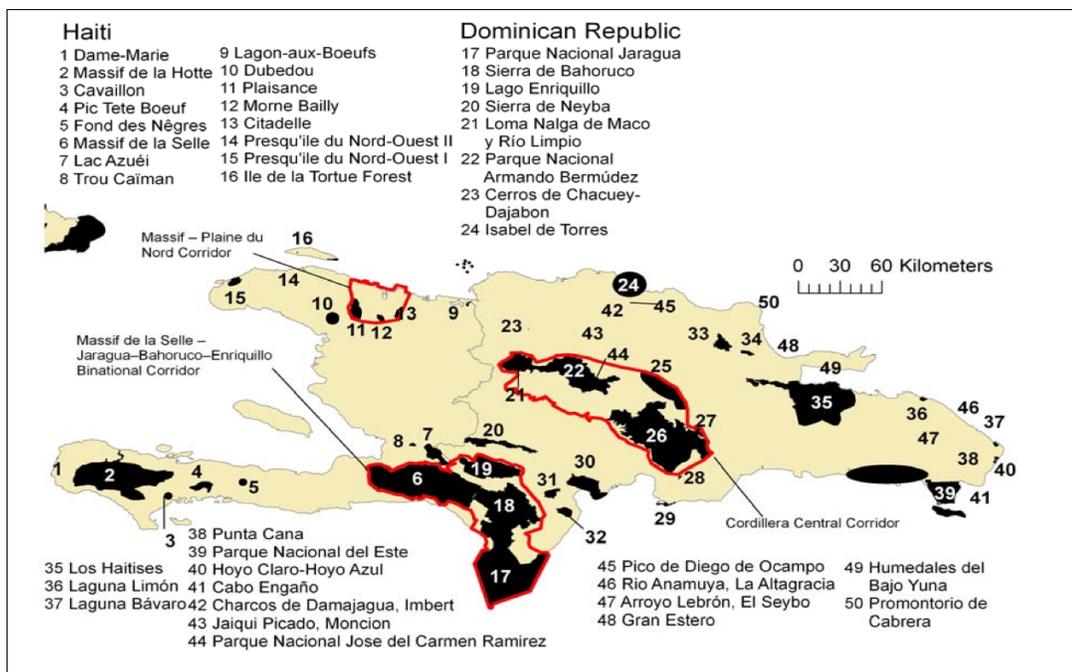


Figure 8: Protected Areas on Hispanola JBE reserve and La Selle (Informant #6, 17, 18 & 19, 2014)

### 3.6.2 Caribbean Biological Corridor (CBC)

In the Caribbean, a tri-national initiative between Haiti, Cuba and the Dominican Republic, known as the Caribbean Biological Corridor (CBC) initiative, was established in 2007 in response to increasing threats of climate change (Figure 11) (CAR-SPAW-RAC, 2011a). The CBC is funded by the United Nations Environment Program (UNEP), European Commission (EC) and other local participating institutions in order “to preserve biodiversity and integrate communities into a sustainable relationship with nature” (CAR-SPAW-RAC,

2011b). The CBC is complementary to the Cartagena Convention (aligning with protocols on protected areas and wildlife) and has been described as the “Demarcation and establishment of the Caribbean Biological Corridor (CBC) as a Framework for Biodiversity Conservation, Environmental Rehabilitation and Development of Livelihood Options in Haiti, the Dominican Republic and Cuba” (South to South Cooperation, 2011).

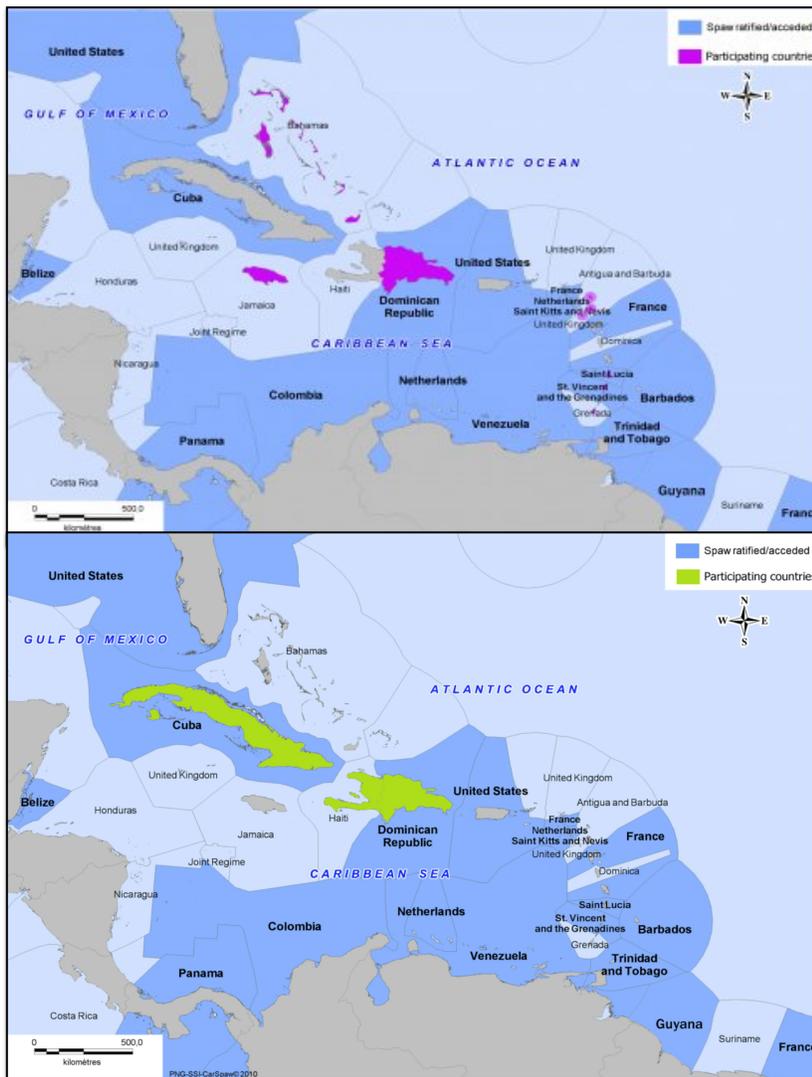


Figure 9: Large scale conservation and connectivity initiatives in which the Dominican Republic is participating (Top: Caribbean Biological Corridor; Bottom: Caribbean Challenge Initiative) (CAR-SPAW-RAC, 2011a,b).

The first phase of the project has primarily been focused on terrestrial ecosystems, and has resulted in the implementation of a variety of successful terrestrially based programs. Specific projects related to marine ecosystems were mentioned early (2009) in the CBC project mandate (Appendix B); however, no subsequent evidence exists which suggests that

any marine-related pilot projects have been put into action in the DR or other participating countries. For the specific objectives of the Caribbean Biological Corridor and more details about the CBC please see Appendix B.

### 3.6.3 Caribbean Challenge Initiative (CCI)

The Caribbean Challenge Initiative (CCI) is an exclusively marine-focused initiative and one of the only regional ones in the Caribbean (Figure 11). The CCI is a political platform supported by private corporations, and is designed to help Caribbean nations reach marine conservation targets (Specific deliverables can be found in Appendix A)(UN SIDS, 2014). Specifically, under the CCI, participating countries commit to conserving and effectively managing at least 20% of their near shore ecosystems and EEZ before the year 2020. Once protected areas are established, the initiative is also linked to a funding mechanism called the Caribbean Biological Fund (CBF) to financially support the long-term management of the newly established PAs. The CBF “is the world's first regional endowment developed to support multiple national level conservation Trust Funds” (GLIPSA, 2014, p.5). This sustainable financing mechanism is available to countries who establish a trust fund based on certain criteria and when satisfied are eligible to receive the 1:1 financing. Nine Caribbean governments (The Bahamas, The British Virgin Islands, Dominican Republic, Grenada, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, and Saint Vincent and the Grenadines) are currently participating in the CCI and are working to implement marine and coastal conservation goals within their countries (UN SIDS, 2014).

### 3.6.4 Caribbean Large Marine Ecosystem (CLME) Project

The CLME project addresses two large marine ecosystems within the Caribbean and the north Brazil shelf and aims to “facilitate the strengthening of the governance of key fishery ecosystems in the Wider Caribbean Region” (UNDP/GEF CLME Project 2011, p. 14). The focus of the project is to help Caribbean nations improve management of their shared living marine resources (LMR) through an ecosystem-based approach; this region has a diverse array of independent States and territories causing management of the regions marine resource to be a challenge (UNDP/GEF CLME Project, 2011). Through transboundary diagnostic analysis (TDA) three problems that effect the CLME have been identified: (i) fisheries over- exploitation, destructive practices and illegal, unreported and unregulated (IUU) practices; (ii) pollution and degrading marine ecosystem health; and (iii) habitat loss and community modification (UNDP/GEF CLME Project, 2011). Overfishing is a pressing threat on approximately 70% of Caribbean reefs, therefore CLME has selected 3 main areas that harbour the majority of these pressures: the continental shelf, pelagic and reef fishery ecosystems (UNDP/GEF CLME Project, 2011).

### **3.7 Context Summary**

Current initiatives (conventions, commitments, agreements) the DR is bound by support the overarching goal of expanding PA networks and creating new MPAs. Current work is directed towards addressing the following concerns: preserving biodiversity, ensuring food resources for future generations, transitioning into sustainable development practices, and increasing livelihood alternatives for locals resource users (DREDE, 2015). The DR is specifically working towards “contributing to the conservation of biodiversity and marine processes, to their integrated management and to the maintenance of sustainable fisheries” (DREDE, 2015, para.9).

The following chapter describes the methodology of this thesis, including the current status of coastal and marine conservation commitments that the DR is participating in. Additionally, the methodology strives to uncover various stakeholder perspectives on how these large-scale efforts are performing. These multiple commitments, democratic processes, environmental legislation, and multi scale partnerships within different organizations and nations makes the DR appear as a leader in both the Caribbean and SIDS community for protecting environmental resources. The following section further explores the progress and challenges that various stakeholders within the coastal and marine network of the DR are facing, and identifies opportunities for the future.

## Chapter 4: Research Framework

### 4.1 Approach

In this study, a mixed method, grounded theory research design was followed in order to gain insight into perspectives from a variety of marine and coastal stakeholders across differing sectors and scales. Semi-structured interviews were used as an approach to addressing research questions revolving around coastal and marine conservation initiatives in the Dominican Republic (See Timeline in Appendix C).

#### 4.1.1 Grounded Theory

In order to address the research questions, an inductive, mixed strategy of both quantitative and qualitative inquiry was used to document the various perspectives of marine and coastal stakeholders in the DR. Grounded theory was used to shape the study and to achieve an appropriate research design where ultimately theoretical and major themes related to the research question arose from the data. Grounded theory originated from Strauss and Corbin (1990) and is summarized by Creswell as “a strategy of inquiry in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of the informants” (Creswell, 2007, p.13). Furthermore, it was a circular iterative process that allowed constant consideration of emerging themes and concepts, as well as data analysis (as seen in Figure 12). This particular exploratory research method uses a non-linear research path where the analysis gives rise to answers for the research questions and objectives during the study in the Dominican Republic (Neuman and Robson, 2009).

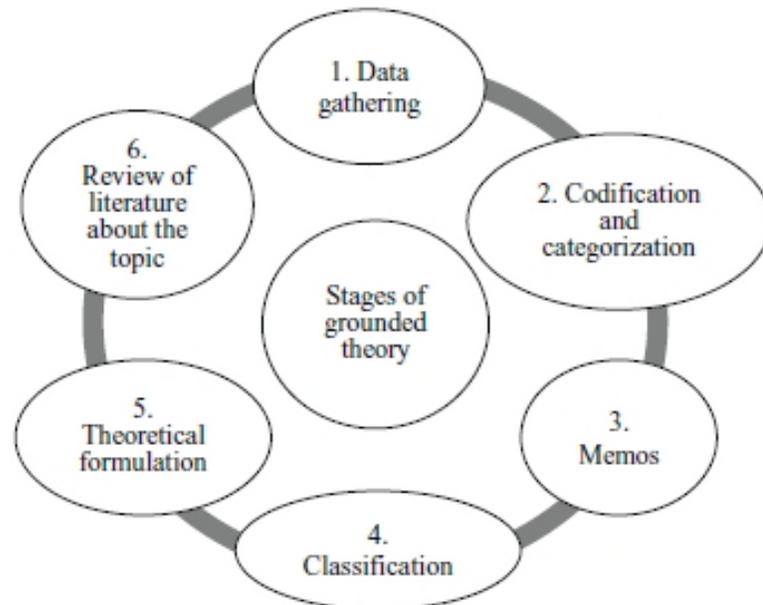


Figure 10: Phases of grounded theory methodology (Marey-Perez et al., 2014).

## 4.2 Techniques Used

### 4.2.1 Mixed Methods

For this study I employed qualitative interviews to determine the perspectives of a diverse array of stakeholders and then used quantitative analysis to illuminate trends found in the interviews. I chose a mixed methods approach for this study due to the potential of quantitative and qualitative findings to complement and inform one another. Additionally, mixed methods allow for broader research questions, and for a more complete understanding to be revealed (Neuman and Robson, 2009; Creswell, 2007). Qualitative data were collected through interviews and analyzed first, qualitatively (i.e. identification of common themes) and then quantitatively through frequency counts.

Qualitative aspects of the research were chosen to allow informants<sup>6</sup> to have a voice about their experiences with coastal and marine conservation (Neuman and Robson, 2009). I designed the study to provide a comfortable space for marine and coastal stakeholders to be honest, and not bound by restrictions that are often found in quantitative approaches. The use of semi-structured interviews provides informants with general topics to discuss, while leaving opportunities open for perspectives and unexpected themes to arise. Quantitative methods were then used to support the qualitative findings by highlighting statistical themes and trends that were identified within the qualitative data set. Adding statistical measures to the conceptual themes, which arose from grounded theory, helped to increase the rigor of the study, and allowed for findings of both a qualitative and quantitative nature.

### 4.2.2 Primary Data Collection

#### 4.2.2.1 Recruitment Strategy

Snowball sampling method was used to identify additional key informants after identifying a first wave through initial research online and a review of relevant DR-specific publications. Snowball sampling is an iterative, multi-stage technique for identifying and selecting people within a certain network (Biernacki and Waldorf, 1981). For the purpose of this study, key informants were seen as coastal and marine stakeholders (resource users) from a variety of sectors and positions, ranging from the community level to high levels of government, who could contribute perspectives from a variety of disciplines, expertise and sectors. The snowball method of sampling, also known as chain referral sampling, is a common qualitative research method used to locate informants for research studies (Biernacki and

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<sup>6</sup> For the sake of this research, informant or interviewee will mean the key informant that has been selected, and agreed to participate in the study.

Waldorf, 1981). There was no attempt to achieve equal numbers of males and females, or equal numbers of informants per sector or scale. Key informants were sought out to be informants because of their specialist knowledge, which includes being familiar with the culture and routinely engaging within the topic area that I sought to understand (Neuman and Robson, 2009).

Table 1: Categorization of informants into appropriate sectors and scales of different stakeholder groups within marine and coastal systems.

Sector	Local	Regional	National	International	Total
Academia	1	1	3		5
Government (MoE) - Office Staff		2	3		5
Government (MoE) - PA Staff		1	1		2
Private Sector		2	2	1	5
Primary Resource Users	2				2
Education		1	1		2
Tourism	3				3
Navy/ Enforcement			1		1
NGOs		4	2	4	10
<b>Total</b>	6	11	13	5	35

Once relevant individuals were contacted, potential informants underwent interview selection criteria and those considered to be key informants were asked to participate in the study and undergo an interview. Selection criteria included the following, the informant had substantial amount of knowledge and experience about: coastal and marine resources; ecosystems and issues within the DR; or to contacts in particular sectors that were considered to be a relevant stakeholder group. After a few individuals were identified, I asked them to refer me to other individual exhibiting selection criteria, and more and more people were identified by the initial links. Study informants were then added as new contacts were suggested and agreed to participate. When it became clear that there were

no new informants within a group, I moved on to another sector. The informants who were recruited to participate in the study (n=35) were key informants of both genders who had a stake in marine and coastal resources within the DR. These informants were primarily local, regional and national, however, in some cases the snowball method led to international stakeholders as well. In the case that key informants work at multiple levels, informants will be categorized at the highest level of which they work (Table 1). Although these informants were from a variety of different backgrounds and expertise, all informants had some direct or indirect links to marine resources and at times, had been involved in protected area management. Informants were involved in tourism (business owners, hospitality), park management and staffing, government (Ministry of Environment), small/local scale fishing, restaurant ownership, academia, etc.

As recommended by grounded theory, I aimed to conduct 20-30 interviews, however 35 interviews were completed due to the combined willingness of key informants to participate and the extended period of time in the field (Creswell, 2007). Interviews were used to ensure up to date and comprehensive information could be obtained from knowledgeable individuals from different sectors in regards to marine and coastal work within a community to national scale context.

#### *4.2.2.2 Interviews*

The composition of the interview pool is from a variety of sectors and scales. These key informants who participated in semi-structured interviews can be seen, or in detail in Appendix F). The semi-structured interviews were comprised of a series of open-ended introductory questions on a variety of topics, and questions were tailored where appropriate to informants' expertise and experience as this became clear throughout the interview (Sample leading questions used in the interviews are in Appendix E). Interviews were held face-to-face at a local establishment of the informants' preference, often their office or a public venue. All 36 in-person interviews were audio recorded, numbered, translated, transcribed and inputted into NVIVO for coding prior to analysis. However, due to technological failures in the field, 2 interviews failed to record and therefore notes that were taken throughout the interview were used. Due to previous commitments, certain informants were not able to complete an in person interview, and in some cases completed a series of open ended interview questions, tailored to them specifically, by email (n=2) or via Skype (n=3).

I transcribed audiotapes and compiled email responses into a document that included the informants' information. A "clean" type of transcription was used, meaning that

transcription was not verbatim in all cases as some data were extraneous and not considered important in relation to the research question (Creswell, 2007). However, final transcripts still included how people spoke, and noticeable moments of emotion towards the topics being discussion vocal cues and tones emphasizing certain emotions or feelings towards a topic, general interest. In the case of supplemental meetings, workshops and events in the field, my participation varied from listening, documenting and attending, to participating and assisting. Ultimately, relevant primary observational data were incorporated into informant transcripts directly, or considered throughout the coding and data analysis process to form analytic memos<sup>7</sup> that facilitated the construction of grounded theory. Furthermore, secondary sources were included such as: journal articles, news reports, grey literature, and internal documents were collected to inform, strengthen and corroborate primary data. Secondary literature<sup>8</sup> were analyzed using interpretive reading techniques to pull out themes, which many researchers refer to as a form of content analysis (Griffith et al., 2012; South to South Cooperation, 2011; UNDP/GEF CLME Project, 2011; Grupo Jaragua, 2006; Mateo and Haughton, 2004; MMARN, 2014).

#### 4.2.3 Participant Observation

Participant observation, a systematic data collection approach to examine people in naturally occurring situations, was used in addition to key informant interviews (Creswell, 2007). I chose to immerse myself in opportunities with coastal and marine organizations while in the DR, for example: meetings, workshops, and volunteering. Through these experiences, I took fieldnotes on how coastal and marine initiatives were progressing, such as a regional meeting in regards to La Selle and JBE biosphere reserve and the possibility of joining these reserves into one bi-national, trans boundary biosphere reserve. By engaging with these additional forums to interact with key informants and coastal and marine organizations, I developed relationships with local stakeholders and fostered an free speaking environment which helped gain a rich understanding of both the setting and perspectives of study informants.

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<sup>7</sup> Analytical memos were created throughout the interview and coding process as a means to note thoughts, ideas and reflections. Anything from subtle gestures, words and tones used during the interviews, to ideas and insights, which emerged during the analysis, were noted in a separate notebook. These memos were then used to create and modify codes, categories and concepts, as well as assisting with guiding the analysis and writing up the results (Strauss and Corbin, 1987).

<sup>8</sup> Note: All official Spanish documents were translated using Google Translate in order to review them in English. I personally translated documents in French noting important points.

### 4.3 Data Analysis

As grounded theory dictates, I analyzed key informant interview transcripts in order to organize units of data into codes based on similar themes, features or conceptual categories (Creswell (2007) (see Figure 13). The depth and detail of 3 stages of coding (first order, second order, selective) vary. First order involves performing a first pass through the data where I condensed the data into initial categories. I performed a second pass over the data but now focused more on meaning of the data and assigning themes. The final stage of coding is selective, the final pass at the data which is now in major thematic categories of the study, and I now determine connections between themes and the most relevant themes for this study. By the end, the goal was to organize the coded data segments into emergent themes, and then finally, after a detailed inspection of the data, to reconstruct the grounded theory by identifying major topics (Strauss and Corbin, 1990). In simpler terms, semi-structured interviews were analyzed and coded to identify emergent themes, limitations, as well as to identify opportunities in coastal and marine management in the DR.

Most of the interview coding and analysis was done through Computer Assisted Qualitative Data Analysis Software (CAQDAS). NVIVO, a CAQDAS program, was chosen for this study to carry out both qualitative and quantitative analysis through organizational, coding, and analysis tools. Software Aids such as NVIVO are very useful for organization and analysis, sorting codes, creating nodes/themes and keeping track of informant quotes (Bazeley, 2007; Peters & Wester, 2007). The use of NVIVO allowed for greater efficiency in the data analysis process by organizing transcript data segments and for more time to be focused on the themes emerging from the data rather than manually organizing them into appropriate nodes. The NVIVO database was used to organize and manually carry out both descriptive and topic coding of the transcribed interviews. Using analytic software allowed for faster analysis, and enhanced the organization of codes as well as efficiently facilitated the initial analysis process. Additionally, the use of CAQDAS program ensured consistency, and eased some of the challenges associated with larger data sets and specifically, carried out quantitative analysis of coded key informant information (Bazeley, 2007; Peters & Wester, 2007). Automated coding functions built into NVIVO were not used as it was not appropriate for this study; however, the only automated function used within NVIVO were queries related to informant information based on sector, scale and gender to create basic frequency count tables. Lastly, the analysis involves both qualitative and quantitative methods therefore graphs, figures, and tables, and frequency counts were used to represent the findings. As there were wide ranges of results, not all results were reported, as this study was not trying to be exhaustive in reporting all themes.



### 4.3.2 Second Order Coding

The next stage of data analysis, second order coding (also known as analytical coding or axial coding), was then performed by revisiting the initial codes and further refining them (Richards, 2015; Saldana, 2015). This involves re-evaluating, reorganizing and regrouping data segments and codes as you critically review the transcripts again (Saldana, 2015). Consequently, existing codes were dropped, added, expanded or merged into new descriptive categories and sub-categories. Grounded theory uses general topic groups from first order coding, and then develops conceptual themes and relationships between the topic codes in second order coding. Some of these themes, or categories, were expected as the questions in the semi-structured interview were tailored to cover certain concepts and themes. Furthermore, this step of the analysis elaborates on the concepts that the themes represent by creating linkages between the initial codes. 'Reflecting and connecting' was a key step in second order coding in order to transition from topic coding into conceptual themes and concepts from the data (Saldana, 2015, pg. 112). This requires note taking and documenting insights via analytic memos throughout the analysis.

### 4.3.3 Selective Coding

Selective coding was used during the final stage of grounded theory data analysis, and was used to finalize the concepts that are represented in the data. The final list was then used to identify patterns in attitudes, and relationships between and within coding themes. Final concepts were then ranked in terms of the frequency with which informants reported them.

Patterns and linkages were also investigated with the final selected themes then arranged into logical order and displayed via figures and other visual displays. Relationships among codes, categories and topics was guided by Spradley (1979, p.111), who suggests using the following statements to help explore relationships: "X is a result of Y (causation), X is a reason for doing Y (rationale), X is a kind of Y (hierarchical), X is a step/ stage in Y (sequence), x is a characteristic of Y (attribution)." Next, using a method similar to the traditional manual method of organization using file folders, a summary of all the final concepts was written by bringing out using coded data segments to explain them. This helped tie analytical memos and pull out major aspects of each conceptual theme. Concepts with the richest data, i.e. most evidence were noted in the results as being the strongest themes.

## 4.4 Additional Considerations

### 4.4.1 Language Considerations

Interviews were conducted in either English or Spanish, whichever language the informants were more comfortable with. In most cases (two thirds), informants chose to conduct the interviews in English, even though it was often their secondary language. In the cases where

informants were not able to communicate in English, or preferred Spanish, I hired a translator to accompany me and assist with both the interview and transcription process. Since the interview questions were semi-structured and open ended, the translator would translate the informants' response to me so I could follow up with another question that was then translated back to the informant. All interviews were audio taped, and therefore it was possible to confirm the Spanish translations during the transcription process for accuracy. During several interviews conducted in Spanish, a full English translation was not provided during the interview due to time constraints. I understood enough Spanish to follow what was said and to formulate questions, to continue the discussion.

There are some tradeoffs identified with conducting research in another language, such as, for example, translator errors. These potential sources of error were limited by conducting training with the translator prior to the interviews as well as keeping the same translator consistent throughout most of the interviews conducted in Spanish.

#### 4.4.2 Ethical Considerations

Ethical implications of the research were reviewed and approved by the University of Waterloo's Office of Research Ethics (ORE). Prior to submitting my Ethics application, I also completed the University of Waterloo Course on Research Ethics (CORE, also referred to as TCPS2). Once key informants were chosen, sufficient time was given to review the study prior to the interview. No remuneration was given to informants, however, when it was appropriate, I purchased a beverage or snack to show my appreciation during the interview. There were no perceived risks associated with this study as informants were guaranteed anonymity and only indirect identifiers were recorded (work position/livelihood method, age, gender, location). The only exception was when an informant requested their name to be used in the study (this sometimes occurs with high-powered officials who are trying to promote their position). The informant ultimately was able to withdraw consent at any time during the interview process and was given ample time to consider participation as not to feel pressured.

All recorded information was stored in a secure location that was only accessible by myself during the field study period. The documents that were used on a daily basis throughout the study did not have any informant identifiers, to mitigate the risk of informants' responses becoming known. Once out of the field, data (anonymous audio files and transcribed interviews) were backed up on personal storage devices. In the case where data was requested by colleagues or organizations, anonymous data was shared. Upon conclusion of this study, an appreciation email (in the English language) will be sent to major contacts (from collaborating organizations), including the final report abstract and also reiterating confidentiality and data security along with an opportunity for them to provide any further feedback.

#### 4.4.3 Assumptions and potential limitations of research

Assumptions in this study are related to snowball sampling and grounded theory methodologies. As shown in Figure 15, grounded theory assumes that I, the investigator will put aside any pre-emptive thoughts and knowledge of theory as collect and analyze the data to prevent any concept biases from emerging. Furthermore, when using snowball sampling we assume that social networks will have influence on recruitment of KI's for this study (Biernacki and Waldorf, 1981). This study was also constrained by certain limitations as seen in Figure 15, however were recognized and addressed when possible to minimize their impacts on the study. For example, during the analysis Investigator bias was reduced by using CAQDAS programming to assist with identification of emergent themes, instead of solely being based on my own opinion of what the categories and themes would be.

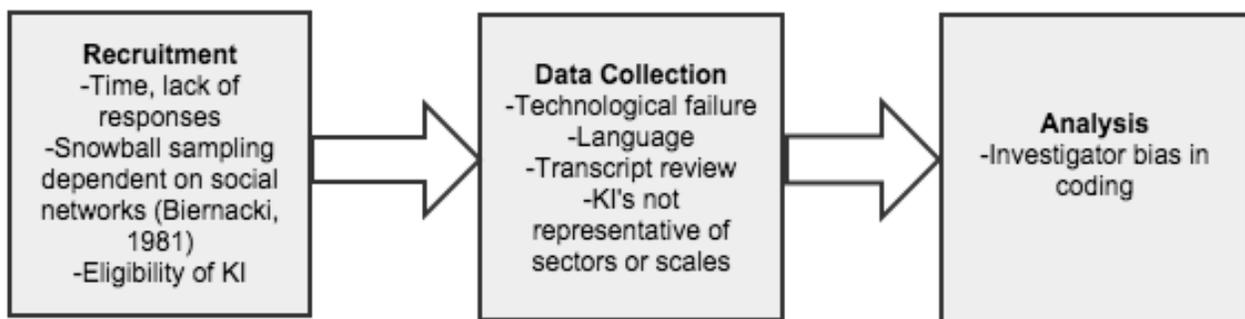


Figure 13: Assumptions and limitations during data analysis stages.

## Chapter 5: Results

### 5.1 Key Informant Data

The interview portion of this study was comprised of 35 Key Informants, which comprised of approximately 65% men and 35% women (shown in Appendix F1). Forty-four percent of informants within this study were considered to work at the national scale and 17% of informants were not based within the Dominican Republic (DR). A detailed list of all of the informants can be found in Appendix F2. As a way to gain a holistic picture of marine and coastal conservation efforts within the DR, key informants from different sectors were targeted through the snowball method. The sector with the most representation is the NGO sector, which contributed 29% (10/35) of key informants (Figure 16).

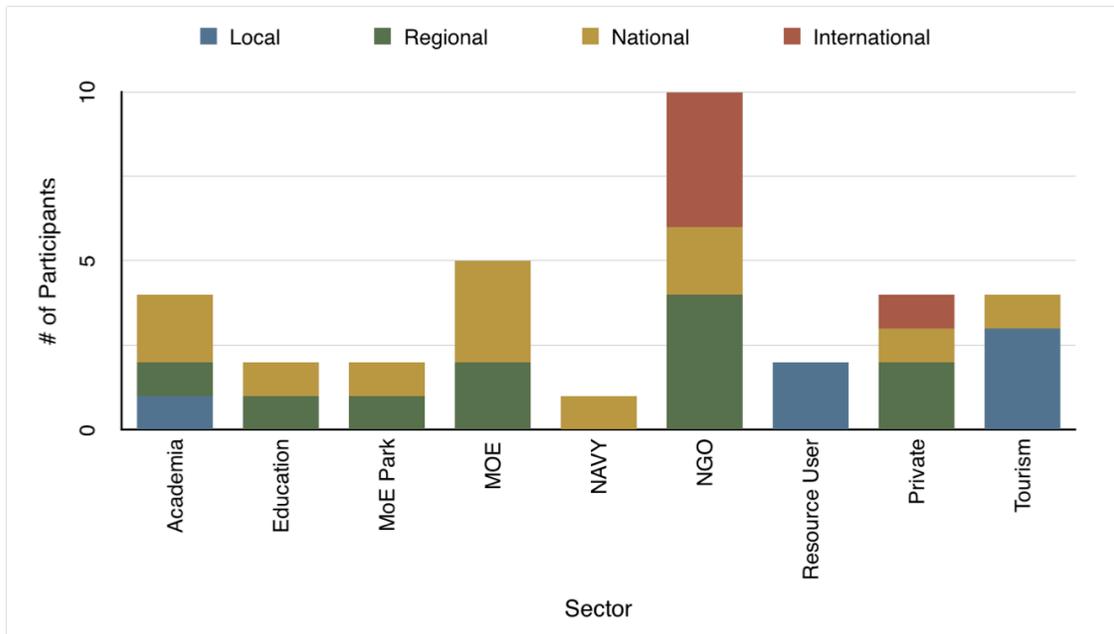


Figure 14: Informant data broken down by sector and scale. Source: NVIVO query data.

### 5.2 Thematic Data from Interviews

Five major topics were revealed using coding and grounded theory methodology. These main topics emerged throughout the coding and data analysis process: connectivity; considerations for management; current and future projects; governance frameworks; challenges; and recommendations for effective management. The pie chart below in Figure 17 depicts the amount of times each theme was coded and shown as a percentage. Within each theme, concepts emerged and are represented in tables in the each section below by

frequency counts and percentages of total coded responses (number of times Informants referenced this topic / total number of codes).

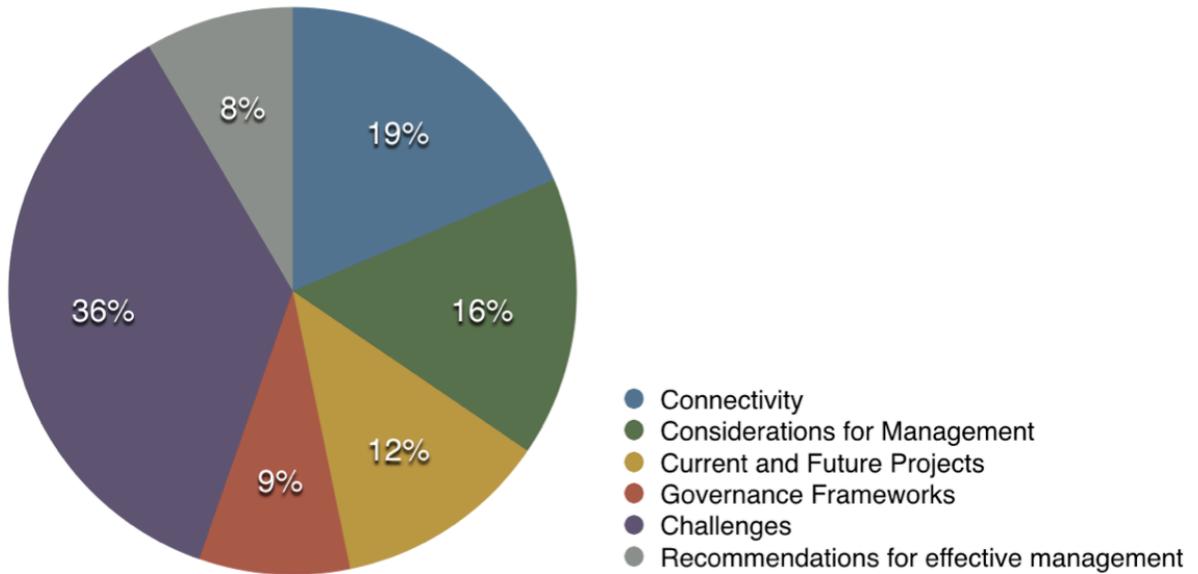


Figure 15: Major themes identified by key informants through the interviews.

### 5.2.1 Connectivity

Connectivity is a key focus of this study, ecological connectivity often being the basis for establishment of MPAs and other large scale initiatives; however, social connectivity was revealed to be an important factor for ensuring the effectiveness of coastal and marine conservation initiatives at any scale. Within connectivity as a major theme, comments and experiences relating to large-scale initiatives, social connectivity and ecological connectivity was the second most coded theme after challenges with 19% (see Figure 17 above and Table 2).

Table 2: Connectivity

	<b>Number of times informants referenced this topic</b>	<b>Percentage of total coded responses</b>	<b>Selected Informant Responses</b>
<b>2.1.2 Large Scale Initiatives</b>	82	11.55	“I think that all the initiatives need to come together. The most important from my point of view are the CCI and WWF. Are the 2 most important organizations working to sync the Caribbean as a whole.” (Informant #6, 2014)
<b>2.1.3 Social</b>	36	5.07	“Connectivity is not only from an ecological point of view but from a social learning, and information and experience sharing.” (Informant #34)
<b>2.1.4 Biological</b>	14	1.97	“I’ve seen complete reefs disappear or die during the last 25 years and the health of the reefs in general getting worse every year. This can be in relation to quality of ecosystem as well as government level changes that affect the management of marine resources” (Informant #22, 2014)
	<b>132</b>	<b>18.59</b>	

Source: NVIVO results.

### 5.2.2 Large Scale Initiatives

When listening to informants’ knowledge and perspectives on large-scale coastal and marine initiatives currently underway in the DR (n=82, Table 2), different scales of initiatives were identified. From local protected areas and the national system of protected areas (SINAP) to international strategies within the Wider Caribbean Region, every informant was aware of at least one conservation initiative in DR, even if it was only the local system of protected areas. The following sections reveal information from both key informants, as well as secondary data including documents from the initiatives that were brought up in the interviews. I will discuss the perspectives and current status of connectivity initiatives on

the Island of Hispanola i) Dominican Republic ii) DR and Haiti, followed by Regional and Caribbean Wide initiatives iii) CBC and iv) CCI and 5) CLME.

#### *5.2.2.1 System of Protected Areas (SINAP) and JBE/La Selle Biosphere Reserve*

Key informants offered a variety of perceptions on PAs and the System of protected area networks (SINAP) as a conservation tool within the Dominican Republic, such as which PAs are known as “model areas”. Many people who were at the national level had different perspectives than people who were in those areas locally. For example when informants were asked about “model” PAs in the country, La Caleta, and Jaragua were the most frequently mentioned. However, from the perspectives of people working on the ground this was not the case. For example in La Caleta, established in 1986, has been revitalized by an NGO as it is conveniently located just outside Santo Domingo, and is easily accessible by road and public transit (Torres and Ulloa, N.D.). However, the interviews indicate that La Caleta, along with other PAs in DR struggle due to the government not fulfilling their part of the funding mechanism that returns finances back to Protected Areas for maintenance and capacity development (this is explored more in Limitations).

During my field research in the Dominican Republic, I also learned that it had been proposed to create a transboundary biosphere reserve between Haiti and DR to assert regional collaboration and strengthen protection in the border area. I was able to gain insight into the MaB (Man and the Biosphere) process and perceptions of joining JBE with La Selle reserves by sitting in on an international meeting in Barahona during the summer of 2014. Organizations who attended this meeting included: Man and the Biosphere (MaB) committee; Grupo Jaragua; CBC; MoE; and Academia were present. Additionally, representatives from other affiliated organizations with the biosphere reserves were present present such as UNEP, UNDP, SPAW, WWF, along with funding support from The Nature Conservancy, global environment facility (GEF) and European Union (EU). Initially, there were high hopes for La Selle-JBE declaration as a United Nations Educational, Scientific and Cultural Organization (UNESCO) Man and the Biosphere site, but despite the international framework/structure local organizations do not feel as though the MaB has made much of a difference (Informant #34, 2014). Also, with the JBE and the bi-national biosphere reserve, DR organizations on the MaB committee haven't been involved in the project as they are meant to. One informant in particular was extremely frustrated in the fact that RAMSAR sites in the DR “aren't being paid attention to” and the declaration of the sites into the international community “ has had no impact on the ground” (Informant #34, 2014).

### *5.2.2.2 Caribbean Biological Corridor (CBC)*

The concept of Mesoamerican corridor, a large-scale connectivity initiative in Central America, was adapted in wider Caribbean region (WCR) on Hispanola and Cuba, thus creating the CBC initiative. This initiative strives to assist with the establishment of new pilot projects as well as facilitate the success of existing ones within participating countries. Many people believe the establishment of CBC was created to support Haiti and assist more directly in the protection of species within Haiti (Informant #4, 2014). Through the interviews, it became clear that the countries within the CBC, Haiti, Dominican Republic and Cuba, have different strengths when considering social, technical, financial and political capacities. For example, a few key informants suggested that DR contributes a managerial role, while Cuba has more technical expertise and experience within the region, by Cuban technicians lack knowledge on day to day management and concepts, such as ecosystem services and the ecosystem approach (EA) (Informant #35, 2014). During the first phase, the 3 countries selected priorities and have been working in the terrestrial realm and are moving forward at their own pace depending on the individual capacities of the nations (Informant #1, 2014). An observation from the interviews is that 17% of key informants were aware of the CBC project and/or initiative, while 24% of those who were aware had worked on some aspect of the CBC at some point in time. However, almost all of key informants who knew about the CBC were unaware of the current status, neither progress nor any tangible outcomes of the corridor thus far. A key informant suggests that perhaps because “the Corridor hasn’t moved as fast as UNEP may have liked”, although many key informants comment that they haven’t seen anything come out of the corridor (Informant#15 and #34, 2014), or that “nothing is moving forward” and “many things left unfinished” (Informant #30, 2014). One informant boldly stated that it has been “a waste of money” (Informant #6, 2014).

The CBC will move into a second phase, focusing on climate related concerns, marine and coastal related projects, and the continuation of partnership building. Informants working with the CBC have confirmed that the CBC will continue to receive finances until 2018 (Informant #8 & #9, 2014). Using the momentum and partnerships formed during this stage of the CBC project, there is now substantial motivation to improve the protection of marine resources within the participating nations, and there is significant interest in pursuing strategies, which will strengthen the marine component of the CBC. Additionally, climate change has not yet specifically been involved within the plans of the CBC thus far, however is likely to appear in the second phase (Informant #35, 2014). Including marine aspects within tri-national project is necessary to ensure connectivity between the countries. The TNC has received some support with the signing of marine aspects of the corridor so that more action in coastal and marine areas can be implemented. All of the coastal and marine projects were planned and prepared, however were never put into action, or were started but not finished. An informant who works for the CBC commented that because UNEP

doesn't have many offices, compared to UNDP, it is not easy to be operative on the ground level without relying on community services, partnerships and organizations at the ground level (Informant #35, 2014). The CBC has now encouraged both National and International NGO's related to the Marine sphere to join the project, and has closely aligned itself with NGOs such as Grupo Jaragua, Specially Protected Areas and Wildlife (SPAW), and The Nature Conservancy's Dominican Republic Program (TNC-DR). However, the CBC currently needs to accomplish the following action to facilitate the credibility and the sustainability of the whole initiative: "obtain the president's signature on an inter-ministerial agreement that will formalize the establishment of the secretariat" (Informant #5, 2014). Jamaica, Colombia and Puerto Rico are currently waiting to join the initiative.

### 5.2.2.3 Caribbean Challenge Initiative (CCI)

The CCI was originally launched in 2008 during the CBD COP in Bonn, Germany. Today there are 9 countries that include the DR who were a part of the initial launching in 2008 (Informant #27, 2014). The Dominican Republic has actually exceeded its goal of establishing 20% near shore protection by creating more than 30 new protected areas in recent years (Knowles et al., 2015). Although this seems like an incredible progress for the country's international profile and a great achievement for the political figures who were involved in the declarations, there still exist some shortcomings. The main issue being experienced is the lack of management in place. The CCI assists in securing sustainable finance to put management plans in place within MPAs to avoid paper parks. A key informant states that DR has upwards of 70% of there near-shore ecosystems protected legally, however management is not in place for many of these PAs (Informant #36, 2014). The key staff members for the CCI within the Dominican Republic, who are currently employed with the Ministry of Environment, gave insight on the current legal status of the DR within the CCI. In summary, the DR has been participating in CCI meetings as well as committing to and establishing protection within the mandate of the CCI. However, due to certain language used in the official CCI document the Dominican Republic has not yet agreed to the statements on the document, and has not yet been signed by the Minister. Key informants who were knowledgeable of the current status of CCI explained that there were concerns regarding the national territory finance mechanism (relating to the Caribbean Biological Fund (CBF)) that the Dominican Republic wouldn't agree to endorse (Informant #3, 2014). They continued to explain that "endorse" at the legal level in the DR means approve (agree). Essentially, the DR *recognizes* the finance mechanisms within the CCI and CBF to reach the protection targets; however, the DR government does not approve all of those mechanisms and therefore have not officially signed onto the CCI. Finally, "endorse" means you will use the mechanism and unfortunately the DR is not satisfied with contributing money in order to receive the financial match from the Private sector (CBF).

The CCI Key Informant (Informant #3, 2014) stresses the need of the DR government to be reminded of this barrier to their official participation and come to an agreement on the language used in the official CCI document.

Looking to the future, companies and organizations within the DR have contributed to the growing list of commitments at the Caribbean Summit of Political and Business Leaders to launch the second phase of the Caribbean Challenge Initiative (CCI). For example Grupo Punta Cana voiced interest in hosting a future summit in Punta Cana, coral restoration training workshops and other marine management sessions to spearhead action on park management (Informant #24, 2014). In partnership with Fundacion PropaGas, Grupo PuntaCana will host national park directors in the Dominican Republic to discuss strategies and develop a coherent plan for management of protected areas going forward (Summit Secretariat, 2013). This shows great initiative from within DR, and demonstrates that many organizations have come together to work towards a common vision/strategy. Informant #7 (2014) points out that this is exactly what donors are looking for. In relation to finances of the CBC, DR is noted as one of the few countries who currently have the capacity to put together a trust fund that would be eligible for the 1:1 match that CBF corporate supporters would match for coastal and marine protection.

#### *5.2.2.4 Caribbean Large Marine Ecosystem (CLME)*

The CLME project area includes 26 countries and 16 territories, so is the largest scale initiative brought up during the interviews. Comments on the CLME were primarily made by staff of international NGO informants and the national MoE who has assisted in coordinating the project. However, a regional informant was able to comment on work that was seen on the ground in one of the CLME areas. Additionally, 2 informants from NGOs indicated a preference towards the mandate and approach of the CLME over that of the CBC, as many successes were seen to come out of the CLME's work thus far (Informant #6 & #34, 2014). Main outcomes that were mentioned included the establishment of new partnerships and on the ground efforts that bring awareness and enhance stewardship for the marine environment. Informants also emphasized that CLME successes are linked primarily to a few specific individuals within the MoE who have been fundamental in pushing the CLME pilot project in DR forward, as well as for reaffirming future commitments to the project. Figure 18 shows the overall governance framework for the CLME which includes multi-scale and cross-sectoral linkages.

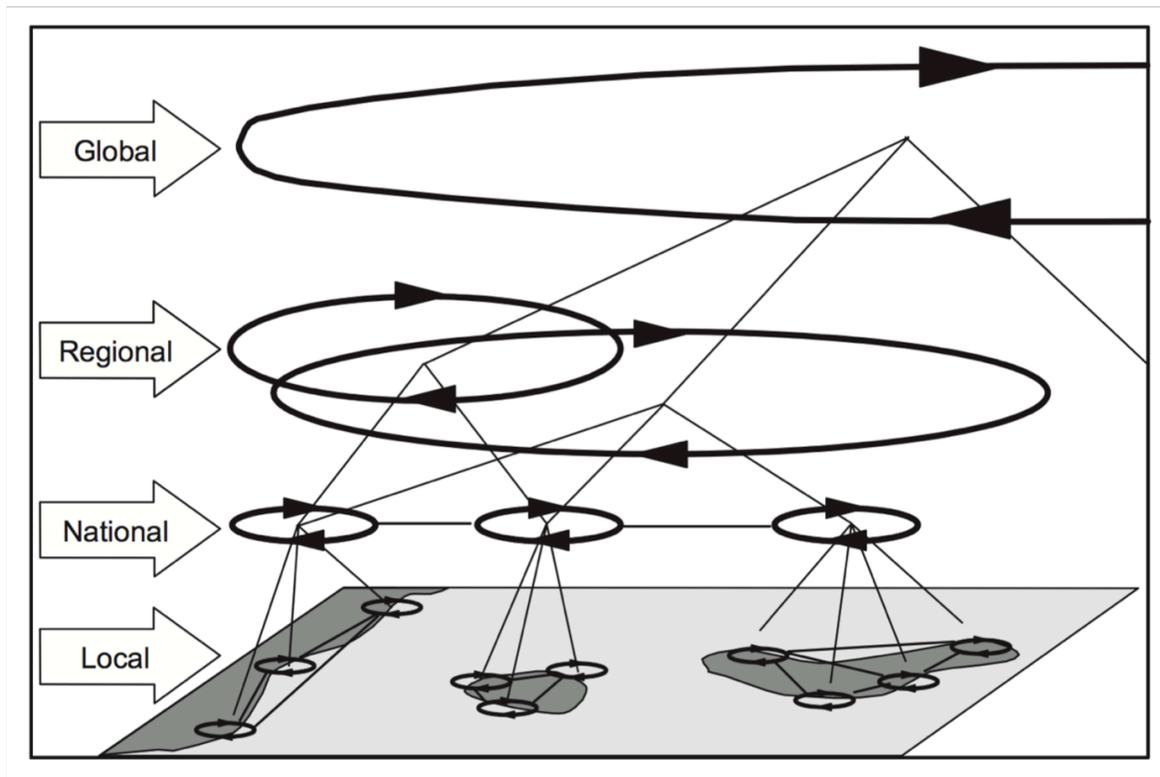


Figure 16: The multi-scale component of the current CLME governance framework highlighting horizontal and vertical linkages (Fanning et al., 2009a).

### 5.2.3 Social Connectivity of Large Scale Conservation

Themes addressed within this section emerged through dialogue with informants regarding connectivity: relations between nations with examples highlighting mentorship programs and wide-scale social learning forums. Key informants' comments, such as the ones highlighted in Table 3, were focused on connectivity components and behaviours that were important in achieving conservation goals such as social and "political connectivity" (n=36). For example at the political level, the CBC:

"Galvanized for the first time quite an important level of commitment for the countries for the environment that had only happened one in which 8 ministers of Environment, and both Presidents actually sat together sat together to sign the declaration. That has never happened before for our region." (Informant #27, 2014).

These forged connections between DR and Haiti at the political level have allowed environmental goals to move forward, such as the CBC initiative, despite other political tensions within other ministries. More broadly, the general concept of social connectivity was a common thread within the interviews. Key informants alluded to the importance of co-learning (social learning) through mentorship programs, knowledge co-production

through collaboration and general knowledge sharing. Current initiatives include a mentorship program between Samana and Massachusetts for training on whale related biology and programming. Additionally, a program which takes local PA staff and managers to other PAs in the region to learn best practices and learn from each other have existed between the DR and Cuba, and DR and Mexico. These programs allow marine conservation actors to share ideas and techniques so similar programs can be implemented in other geographic areas. Numerous regional NGO members commented on the value of this type of sharing process and how it is a “step to success” and “a more practical approach compared to large scale projects such as the CBC” (Informant #6, 2014). One key informant whom had implemented this exchange with his PA staff notes, “We are currently organizing 12 Haitians to visit Cuba to see a functioning MPA, to be inspired to achieve that within their own nations’ PA.”(Informant #6, 2014).

Social connectivity within and between nations is important to establish forums to share experiences, practices, lessons learned, disseminate information and allow co-learning to occur. During the interviews, when appropriate, key informants were asked if they have had experience with such forums. Often the key informants were unaware of such forums to connect with others in their field, but when asked if such forums existed (or if the Key informant had access to) many responded with comments relating to “that would be great” (Informant #10, 2014). The need for both national and Caribbean wide knowledge sharing platforms is paralleled at the local level where key informants from fishing cooperatives and small tourism operations rely on techniques, data and best practices coming from other areas. One informant expresses that “There is a lot of co-learning that could happen in Samana. That would be good.” (Informant #15, 2014). The previous quote refers to the benefit of sharing practices among tour/boat operators for best whale watching etiquette and business practices. Sharing ideas and techniques within social networks is important for scaling up and replicating/implementing programs in other areas. One example is to send PA managers and local staff to Cuba or another areas where PAs are working effectively to show them how to manage and maintain a marine park from another perspective in another area of the Caribbean. A final example of exchanging information and disseminating best practices within Caribbean MPA networks is via CaMPAM Network (Caribbean Marine Protected Area Management) (Fanning et al., 2009a). This network and online forum allows for information about marine PAs to be shared. An additional method of connecting to a larger network is by getting MPAs a SPAW designation (Specially Protected Areas and Wildlife), which is the only regional legally, binding biodiversity treaty for the Wider Caribbean. Benefits for such designation includes increased recognition and awareness, increased marketing opportunities (tourism and employment), and opportunities for financial support<sup>9</sup>.

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<sup>9</sup> Note: Although I attempted to follow up on items such as the signature of the inter ministerial agreement with the CBC, or whether the DR is yet a participant in the CCI at a political level,

### 5.2.4 Biological

Key informants had much to say about biological and ecological conditions, changes and links to connectivity conservation (n=14). Main points that were brought up were in regards to noticeable degradation in regards to marine species presence and habitat health throughout the country, as well as the importance to consider the large picture when trying to manage resources. One informant captured the overall picture of biodiversity in the country (see Table 4, Informant #22). For the purpose of this study, being aware of and understanding current and predicted biological changes was important for acquiring background knowledge on coastal and marine resources of the country. Therefore, biological items such as threats will not be discussed beyond acknowledging that informants reported, in general, a decline in quantity and condition of various marine resources (namely fisheries and habitats).

### 5.3 Considerations for management

While discussing conservation efforts and large-scale initiatives, many comments regarding considerations for management were brought up. Concerns ranged within social and ecological systems, stakeholder values and incentives as well as a variety of opinions and perspectives on PA establishment and management.

Table 3: Considerations for management Source: NVIVO results

	<b>Number of times informants referenced this topic</b>	<b>Percentage of total coded responses</b>	<b>Selected Informant Responses</b>
<b>Perspectives on PAs</b>	24	3.38	“You can protect an area without it being a park”, “Its not a solution to just create a PA”, “Some Pas don’t even deserve to be PAs” (Informant #10, 2014)
<b>Socio-Ecological Systems</b>	73	10.28	“You can’t change all the livelihoods of the people who live here but you can study what are the most important points you need to consider to make a

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Informants failed to respond to inquiries within a year of the initial interviews.

			change” (Informant #8, 2014)
<b>Stakeholder Incentives for participating in responsible use of natural resources</b>	16	2.25	“It’s easier to transition livelihoods when there is another option” (Informant #9, 2014), “They just keep thinking about the money of today” (Informant #20, 2014)
<b>Total</b>	<b>113</b>	<b>15.92</b>	

### 5.3.1 Perspectives on PAs

The dominant themes when analyzing key informants’ perspectives on PAs involved the process of establishing PAs, how PAs are being managed, and model examples of PAs within the DR (n=24, Table 4). In regards to establishing and managing PAs within the DR, the process is highly political. A government sector informant admits that evaluations of potential PAs are often done after the area is proclaimed a PA via Presidential decree (Informant #2, 2014). This causes many areas to appear as Parks and PAs on paper at the legal level, however the area may not have 1) ecological reasoning to be a park 2) staff allocated to work in that area 3) a management plan. This is echoed in Table 4, where one informant expressed that not all marine and coastal ecosystems should become a PA. Additionally, key informants explained that the rationale for this seemingly ineffective way of establishing and managing PAs is heavily due to the incentives/motivation of the Ministers in power. Informant #10 suggested that these actions are due to pressure to comply with international treaties and agreements (for example CCI), and to leave the legacy of “protecting” the environment (Informant #10, 2014). Informants mentioned the many challenges that arose with this highly political method of establishing PAs such as: the lack of technical support for effectively managing the PA due to lack of staff and resources (see limitations). Additionally, mistakes and oversights are made. For example, the Marine mammal sanctuary in the north of the country was signed into decree with the wrong coordinates, and a large park in the east actually overlaps with another PA.

Despite the negative comments on PAs within the country, almost all key informants from local fishermen, to international contacts had something positive to say about a PA when it was perceived as functioning properly<sup>10</sup>. The spillover affect of PAs was a benefit that most informants stated was important to local communities. Additionally, when asked if there was a model conservation example or PA within the country that is functioning well there

<sup>10</sup> Characteristics of a PA that is functioning properly include: enforcement, general compliance, clear boundaries, appropriate management etc. Day et al., 2012)

was a discrepancy in responses between key informants who worked at the local and regional level, compared with those working at the national level. For example, when informants were asked about Model Protected areas in the country, La Caleta, and Jaragua were the most frequently mentioned. However, from the perspectives of people working on the ground this was not the case. A notable similarity arose from field observations and informal conversations. Both La Caleta and Jaragua NP both currently, or historically, have had a co-management arrangement between the government and another stakeholder, such as a local fishermen association or a NGO partner.

An interesting point brought up during an interview with Academics and NGO workers who work on terrestrial environments in Dominican Republic was that people do not necessarily comprehend the idea of connectivity. Informant #13 (2014) states: “people don’t have the comprehension of connectivity between upstream and downstream water, or the watershed as a system where the outputs are released at the coasts”. Informant #13 continued to comment that NGO’s and organizations often mandate a systemic perspective, but connecting and collaborating with coastal actors are often out of scope or budget. A hypothesis was given by one informant that people in the mountains are often poorer than on the coasts, so “maybe the people downstream should pay the people in the mountains to preserve the environment.” (Informant #14, 2014). This concept is commonly referred to as payment for ecosystem services (PES).

### 5.3.2 Social - Ecological Systems

Marine Protected areas are widely considered social-ecological systems (Rodriguez-Rodriguez et al., 2015). Perceptions relating to the relationship between social and ecological systems accounted for 10.28% (table 4) of coded material from the interviews. Two ideas relating to social-ecological systems arose during the analysis: i) PA implications for communities; and ii) fishers (link to resource extraction varied based on region)

#### 5.3.2.1 PA Implications for Communities

Prior to theory on social-ecological systems, the establishment of many PAs in DR did not consider potential impacts on communities, or areas beyond PA boundaries. A common practice was to displace entire communities during the implementation of a PA. The lack of consultation and/or dialogue with local communities about PA existence and boundaries have led to conflicts, non-compliance and overall negative perceptions on the purpose of PAs. One informant explains that PAs are not always clearly marked, so it is extremely difficult for local resource users to determine if they are inside or outside of the park (Informant #12, 2014). This sentiment was echoed by another informant who witnesses

land tenure issues between government and locals to the point of being a social justice issue as the government was seizing land, and evicting people who were farming it (Informant # 34). The informant continued to explain the violence that ensued resulting with families being split up. Severe frustration was noted as the informant added, “the park administrators don’t even know which places are in the park and which are out.” Additionally, fishing is “often the only option available to obtain income for their families, even though it will be in the short term since many fisheries in the DR are declining.” Similar comments regarding the primary views of fishermen “They just keep thinking about the money of today” (Informant #20, 2014). This highlights the limitation of education of the local resource users to plan for their future and how responsible fishing practices are needed to sustain resources, but also that other opportunities do not exist. With these persisting problems in terrestrial PA boundaries, it is even more complex to achieve in Marine PAs due to the complicated enforcement and access to boundaries in the water.

### 5.3.2.2 Fishers

During the key informant interviews, when a comment relating to human and environment or PA issues arose I would follow up with a question on how to involve communities with practices that have negative impacts. Responses were dependent on the community context as some communities were more aware than others of the damage resulting from human activities/practices (including destructive and non-targeted fisheries, or industrial and tourism practices). In the case where communities, in general, were unaware of the impact their behaviours were having on coastal and marine systems, it was suggested that education and higher presence from MoE was needed (more information in limitations). However, there were examples of communities who were aware of the linkages between human actions and the declining quality of coastal systems. This led to the idea of alternative livelihoods and whether or not there were opportunities for local resource users to transition from extractive practices to an industry that is less damaging i.e. more sustainable.

When asked if communities will be able to adapt to alternative livelihoods, responses depended again on the communities. Key informant #32 (2014) states that different livelihood opportunities are currently not being considered. However, the informant suggests that should a viable alternative employment opportunity become available, it is probable that community members have the capacity to adapt. This concept of adaptability has not yet been studied in great detail. The primary resource user informants (n=2) confirmed that they were willing to switch professions to more environmentally and socially responsible practices, i.e. primarily switching from fishing with *chinchorro de arrastre*<sup>11</sup>,

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<sup>11</sup>Gill net in Spanish

given that the opportunity was financially viable (Informant #17 & #33 2014). In fact, Informant #18 was forced to change and develop an 'eco-tourism' company due to the decline in profits from fishing (Informant #18, 2014). Monti Cristi (MC) fisheries have been sustained due to lack of access from a main road. However, as access increased, local fishermen began contributing to the value chain throughout the country. Now, the fisheries in the MC area could no longer support all the fishermen. "We were no longer successful, and unable to depend on the fishing industry" explains Informant #18 who has now settled into a new non-extractive small business. Increased access to previously isolated areas is increasing pressure on marine resources, and in turn on livelihoods of coastal communities. Concerns of social and biological development impacts were also expressed by three other informants across the country (Informant #15, #16 & #20, 2014). However, a transition has been underway in other parts of the country where a shift to tourism investment and development has occurred, such as Samana and Punta Cana. Here, I found examples of fishing boat captains and owners transitioning into captains of boats for snorkeling or wildlife tour positions. However, the willingness to switch professions may not be felt by all resource users as mentioned in a recent study by another researcher I met in the field. Her study revealed that direct resource users and individuals who are sole providers of income have the lowest interest in changing occupation (Lohmann, 2015). This study was completed in 3 coastal communities within the DR. Two local informants echoed Lohmann's findings (2015) expressing: "It's hard to change. They're [fishermen] not attached to their job, they're attached to their area and their skills." (Informant #18 & #19, 2014). So ideally, when conceptualizing appropriate alternative livelihoods, it is important to seek opportunities which involve the same or similar skills but in a more sustainable way. A member of the FA in the North confidently stated that within his community of fishermen he doesn't believe that it would be possible to create fishers. However, the best course would be to change the way that fishermen fish. Additionally, a NGO member at the regional level notices this, "fishermen are very independent, and this is a new thing they don't want to be co-opted into anything." (Informant #20, 2014).

### 5.3.3 Stakeholder Incentives for Responsible use of Natural Resources

Depending on the motivation, goals, and mandates of stakeholders, incentives required to undertake conservation efforts and initiatives are likely to be different (n=16, Table 4). For the tourism sector, the appropriate incentive had to be almost exclusively economic in order for companies to be interested in environmental protection. However, one successful example on a small scale is Punta Cana Ecological Foundation (PCEF) which developed an environmentally focused business plan over 35 years ago (Stipanuk, 2003). This focus has helped shape their brand in the sustainable development and tourism industry, making them extremely successful. Depending on the community, some unique strategies were discussed in interviews to integrate local resource users into more sustainable livelihoods.

For example, PCEF hires local fishermen for full time employment, approximately a dozen fishermen and a dozen women have now been trained and employed to participate in other capacities such a coral gardeners (Informant #24, 2014). Men are hired as boat captains while the women have been strategically hired to use taxidermy techniques and sell stuffed lion fish as curios. This allows the women to pressure their husband to catch lionfish, removing this invasive species from the water, and to provide a more sustainable souvenir other than shells or other marine species products etc. Therefore, incentives for local resource users to transition into more responsible practices regarding marine resources involves providing resource users with stable employment opportunities of which they can make a living.

Table 4: DR organizations with a stake in marine and coastal resources (inclusive of those that were noted during the study). Stakeholders with \* are among the most active organizations in DR and are described below.

<b>National</b>	<b>International</b>
Reef Check- DR*	CIBIMA
The Nature Conservancy*	Grupo Jaragua*
Ministry of Environment	Grupo Punta Cana*
Ministry of Tourism	UNEP: United Nations Environment Programme
Ministry of Agriculture (CODOPECSA)	SPAW
Agrofronterra	CEBSE *
UNDP	GEF
WWF	European Union
CBC	German Government
Local Fishermen Cooperatives	Tourism companies

A key informant from an isolated site revealed that the fishermen in the village were closely connected to marine resources and understood what needed to be done in order to sustain the fisheries of the area. The informant explained that the capacity of the area was low to implement any wide scale changes on their own, however if there were certain incentives in the form of equipment trade, than the fishermen could turn in their destructive nets for alternative fishing equipment that would have less impact on marine life (Informant # 17, 2014). This could be arranged through government or perhaps an NGO with funding to facilitate the transition to more responsible fishing practices. Various incentives for government to participate or approve marine and coastal efforts included legacy, public

perception, and international recognition.

i. **Reef Check** - Dominican Republic is the local arm of an International NGO that works towards a variety of initiatives to restore the ocean environment. RC-DR does a lot of work on lion fish eradication to restore regional biodiversity, as well as more recently, RCDR has become invested in the market-value chain as a mechanism to reduce the consumption of important/exploited species. At its core, RC assists with monitoring and coral restoration projects across the country, often paired with a partner (Personal Communication, 2014). RCDR has also been co-managing La Caleta NP with the MoE, as well as working with local fishermen associations to provide non-extractive sources of income. “RCDR is taking action to turn this park into a role model of sustainable protected area management in order to replicate it in other similar areas of the Dominican Republic.” (Torres and Ulloa, p.2, N.D.).

ii. **The Nature Conservancy (TNC)** is another leading global organization, which actively conserves important ecosystems for both humans and the environment. In the Dominican Republic, TNC supports Ridge to Reef approaches to assist in the protection of some high priority natural areas: Madre de Las Aguas, Samana Bay and Parque Nacional del Este (Personal Communication, 2014; GEF, 2011).

iii. **Grupo Jaragua (GJ)** is a local Dominican non-governmental organization that was founded in 1987 to assist in co-managing Jaragua National Park (Rupp et al., 2005). GJ has since been involved with establishing the Dominican Republics’ first UNESCO Biosphere Reserve, Jaragua-Bahoruco-Enriquillo Biosphere Reserve, and are currently part of the technical group for other coastal and marine conservation initiatives (Personal Communication, 2014).

iv. **Grupo Punta Cana** established the Puntacana Ecological Foundation to support local collaborative efforts in the tourism industry to maintain coastal and marine resources such as coral reefs, and surrounding habitats. This private company works with a wide range of stakeholders within the DR towards environmental protection and restoration on the east coast of Dominican Republic. Their efforts also include working with local fishermen to help achieve a balance between “economic growth, environmental protection, community inclusion, and a celebration of local culture.” (Stipanuk, 2003).

v. The **Center for the Conservation and Eco-development of the Samaná Bay and its Environment** (CEBSE are the initials in Spanish) has been operating in the Dominican Republic since 1991. CEBSE’s mission is to achieve the conservation and sustainable development of the natural and cultural resources of the Samaná Bay and natural areas that surround it, with the active participation of its communities. This organization seeks to improve the sustainable use of natural resources in the Samaná region, “through the

promotion of production models and services that improve the quality of life of the communities and minimize negative environmental and cultural impacts.” (DREDE, 2015).

As previously shown, informants from different sectors yielded different perspectives on PAs. Informants also require different incentives to get on board with conservation initiatives. Incentives varied depending on the sector, and focus of the organization. Sector-based incentive examples and current mechanisms were revealed during the interviews for the tourism sector, local resource users and government.

## 5.4 Current and Future Projects

### 5.4.1 Current initiatives

Coastal and Marine initiatives in the Dominican Republic go beyond the establishment of protected areas and participating in large-scale connectivity initiatives (n=18, Table 5). Many other important projects mentioned were at the local level, and included: community engagement; research; education; outreach; and citizen science. The theme of “current and future projects” was important for gaining background information about priorities, projects and concerns facing stakeholders; however, comments coded within this category often overlapped with other topics and I will not be discussing them at depth here.

**Table 5: Current and future projects.** Source: NVIVO results

	Number of times informants referenced this topic	Percentage of total coded responses	Selected Informant Responses
<b>2.3.1. Current Priorities</b>	18	2.54	-
<b>2.3.2 Future</b>	13	1.83	“The fishermen know why nets are bad. It’s about finding the mechanism, a mechanism to create action.” (Informant #16, 2014)
<b>2.3.3 Successes</b>	21	2.96	Consolidate value chains around responsible fishing practices (MC) (Informant #14, 2014).
<b>2.3.4 Threats</b>	35	4.93	
<b>Total</b>	87	12.25	

A common priority that emerged during the interviews was that the Dominican Republic (NGOs and central government) has been focused predominantly on terrestrial

conservation thus far, and has not yet acted on coastal and marine ecosystem protection at a large scale. This is supported by the general understanding that there is a greater professional capacity for research and education related to the terrestrial environment when compared to the marine environment in the DR. Although terrestrial environments have received more attention, there have been DR-related successes in the marine realm at the local, regional and international levels.

#### 5.4.2 Future

Many informants within the study, primarily at the national level, believe that in the coming years coastal and marine environments will become more of a priority for the government (n=13, Table 5). Additionally, many NGOs and private company informants believe that in order to continue to work effectively to conserve coastal and marine environments, they will have to be given more power and responsibility to make decisions within the regions they are working in (Informant #23, #6 & #34, 2014).

#### 5.4.3 Coastal and Marine Successes

Many examples of coastal and marine conservation success via projects and initiatives were made apparent throughout the interviews in addition to being witnessed by key informants in many parts of the country. Below in Table 7 are 4 selected examples given by key informants, implemented at numerous scales (n=21, Table 6).

Table 6: Current coastal and marine conservation successes at local to international scale

Scale	Effort	Success	Importance
<b>Local</b>	Market based incentives are being used at the local level and helping shape the values of marine resource users at every scale.	A full time position was given to someone in a Northern Fishermen’s association to weigh and price catches. This encourages transparent assessment, and in turn incentives to catch larger fish sizes as more compensation is given for more responsible fish types. This has caused this community to move forward in living responsibly with marine resources.	“They’re [market based incentives] giving a price incentive to the fishermen if they bring in larger fish. And as an association, they are not bringing in or buying fish if they’re out of season. As a result of this price incentive for larger fish, they are seeing a reduction in the catch

			of really small fish.” (Informant #17, Fisherman, 2014)
<b>Regional</b>	Balancing tourism, research, education, and conservation on the Eastern coast of the country.	Private sector involvement has increased capacity, contributed funds, and provided fishers for local community members.	Punta Cana Resort and Ecological Foundation have been contributing to the sustainable development of the eastern region for over 15 years.
<b>National</b>	Create legislation to support environmental initiatives and considerations throughout the country.	The top down efforts from the centralized government such as the enactment of law 64-00 that has allowed for the creation of MoE.	Value of government support through policy allowing for marine conservation efforts to be implemented within the country.
<b>International</b>	Create a co-management environment (fisheries) in Monti Cristi with the Caribbean Large Marine Ecosystem (CLME).	The government is supportive of the notion of establishing a co-management arrangement in Monti Cristi NP (the PAs within MCNP).	Success in MC systematically got the government involved in discussing co-management at the community level.

#### 5.4.4 Threats

There are many threats facing coastal and marine environments in the Dominican and therefore for the users that rely on these systems (n=35, table 6). Specific imminent and current/ threats identified by key informants are shown in Figure 19, and selected threats such as overfishing, pollution, and mass tourism are briefly discussed. Many of these threats are linked with exploitation and destruction of marine resources causing impacts to habitats and nearby communities. Overfishing and the use of destructive gear, such as gill nets, is being experienced throughout Dominican Waters: “Gill nets make it hard to target specific species, they [fishermen] take everything” (Informant #18, 2014). An informant working at the local level believes that “There is no such thing as sustainable fishing, only responsible fishing practices for small scale and artisanal fishers.” (Informant #14, 2014).

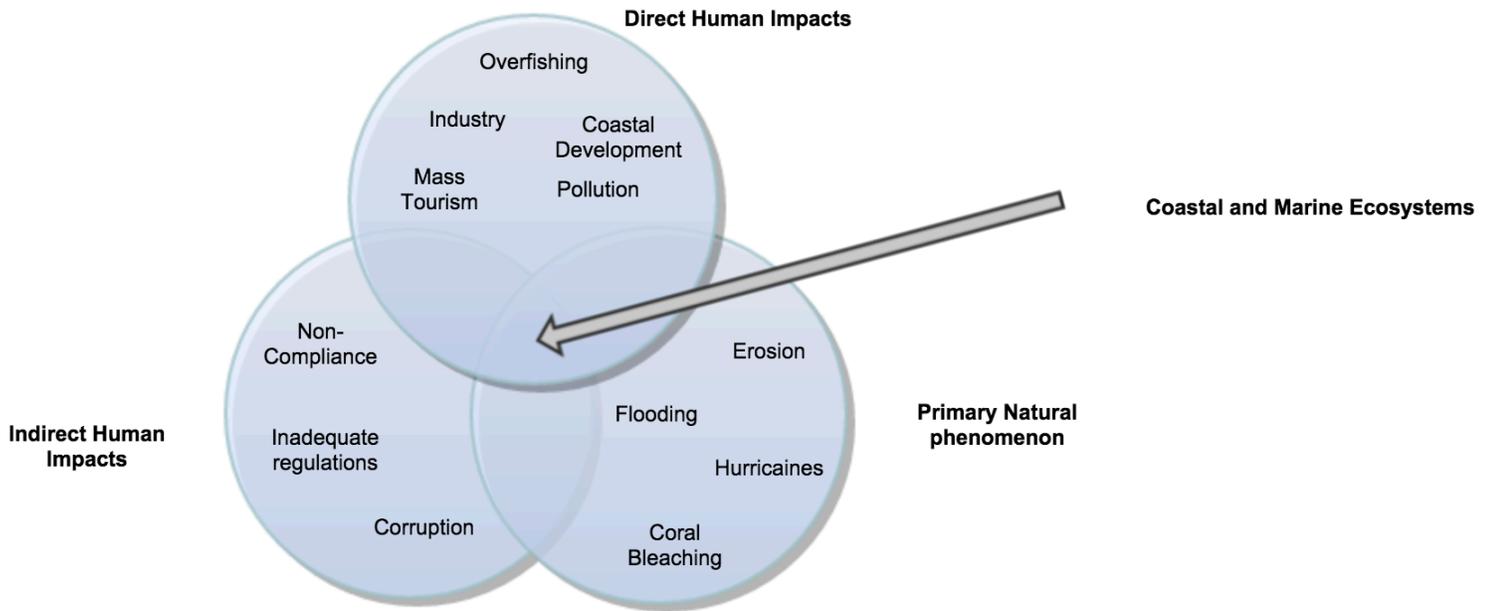


Figure 17: Perceived threats to coastal and marine environments by key informants.

Many coastal industries such as salt production and coastal and marine tourism are perceived as current threats in many areas of the country. The biggest salt production in the DR is extremely close to National Parks in the Monticristi area in the North (Informant #30, 2014). A concern for pollution stems from a large shrimp fishery in Samana bay (northeast), the only area that is not protected within the Marine Mammal Sanctuary (MMS). Additionally, an informant who works in the area claims the shrimp fishery is managed very poorly (Informant #20, 2014). Additionally, farming and agricultural runoff and sediment upstream also dumps into the bay. Coastal industries such as these destroy coastal habitats and also contribute a large quantity of pollution/contamination to nearby ecosystems, especially mass tourism. Regulations for the proper disposal of waste exist for hotels, however the majority of businesses do not comply (Personal Communication, 2014). In Santo Domingo, academic institutions are concerned for coastal areas because researchers have noticed extreme contamination of a small river which leads to the ocean, as many large hotels in one area drain into it (Informant #11, 2014). There are major concerns regarding the booming ‘all inclusive’ experience in select coastal regions, as well as for the cruise ship industry. Local NGOs and local business owners have concerns about cruise ships constantly entering MMS during whale season (Informant #21, 2014). In addition to threatening marine species from too much boat activity in Samana Bay, large tourism companies control their clients’ experiences from airline travel, accommodation, transport and tours. One informant suggested that this leaves no opportunities left to support local businesses, i.e. community development (Informant #21, Small business owner, 2014). Further comments made by a informant (#32, 2014) state that current tourism practices are not a part of the biological culture of the country and that “Locals are being pushed away with the constant introduction of all inclusive tourism. The tourism industry can't hire everyone”.

## 5.5 Governance Frameworks

This section is comprised of governance and governance framework (i.e. structure, arrangements) related themes reported by informants such as: private sector involvement; management arrangements; and having a unified vision for all stakeholders (as seen in Table 7). The current perceived governance structure of the coastal and marine conservation network in DR is shown in Figure 20.

Table 7: Key informant comments relating to governance frameworks and stakeholder involvement.

	<b>Number of times informants referenced this topic</b>	<b>Percentage of total coded responses</b>	<b>Selected Informant Responses</b>
<b>2.4.1 Private Sector Involvement</b>	26	3.66	NGOs comments on how to improve governance within the coastal and marine sector: “We are trying to involve private sector in small pilot projects. Try to show them direct benefits such as water, reforestation, ecosystem restoration, mangroves. There is a future in engaging the private sector, a need for more participation from them.” (Informant #1, NGO, 2014).
<b>2.4.2 Devolution/ Management Arrangements</b>	12	1.69	Currently in the governance and management processes, “[There is] a need to involve local governments because regional governments are missing in the process.” (Informant #1, 2014) “For marine protected areas what we really want is to implement co-management where we have the fishermen work with us closely and that are respecting limits...Hopefully

			we can work with them to find alternatives so they can do their part as well.” (Informant #23, 2014, NGO Perspective)
<b>2.4.3 Unified Vision</b>	23	3.24	“There is no general plan- we need an integrated plan both in PAs and other areas” (Informant #32, 2014) Without a process it’s very difficult to go forward. You need effective regulations and structure. (Informant #8 & #30, 2014)
<b>Total</b>	<b>61</b>	<b>8.59</b>	

Source: NVIVO results

### 5.5.1 Private Sector Involvement

A comment made by key informants emphasize that stakeholders were missing from decision-making for coastal and marine conservation in the DR, particularly industrial companies and tourism-related bodies from the private sector (n=26, Table 7). Although there exist examples given by key informants where the private sector has been involved (see successes) in conservation initiatives in small scales, in general, key informants at all levels identified an opportunity to have private sector companies, especially industry and tourism, be more engaged in conservation. As previously mentioned, industrial extraction (e.g. salt production, coastal dredging) or tourism companies have great incentive to become more active in protecting and maintaining coastal and marine systems, as this is primarily how they maintain their businesses.

Currently, the ministry of tourism (MoT) seems to be concerned primarily with getting tourists into the country and not on the effects tourism has on the country’s natural resources during their stay in DR (Personal Communication, 2014). For example, tourism in coastal and marine areas is shown to have negative impact on the surrounding environments when tourism developments are not well managed. Impacts include increase in ecosystem vulnerability from removing important coastal habitats and replacing with

large infrastructure, this leads to negative effects on ecosystem integrity and adds stressors to already threatened species and environments (Honey and Krantz, 2007). Additionally, resource consumption from tourism such as fresh water and food creates an additional demand that often supports unsustainable practices and contributes further to social issues within the region (Honey and Krantz, 2007). I have observed that there is rarely a MoT representative at the local level to participate in local environmental committees and decision-making. Informants claim that there are only a few hotel associations within the country, and these are in the high priority tourism destinations such as Punta Cana (Informant # 23, 2014). Current challenges with tourism in the DR relate to receiving and maintaining local economic benefits of tourism while protecting natural resources (Schelhas et al., 2002). In addition to tourism, industry in DR such as mining, dredging, engineering, agriculture, salt manufacturers, waste treatment have an opportunity to contribute to the sustainability of ecosystems services for the area (Informant #15, 2014). For example, dredging and heavy salt production are occurring in coastal areas notably in the southwest, and northwest of the country. These industrial stakeholders who have an influence on the health of coastal and marine areas are not involved in the decision making process. As seen above in Table 7, informants agree: “There is a future in engaging the private sector, a need for more participation from them.” (Informant #1, 2014). This is not only to raise capacity and mobilize resources towards conservation initiatives, but because the private sector is benefiting from ecosystems services provided by coastal and marine areas and they should assume some responsibility for its preservation. This point was echoed by many key informants; the fact that private sector companies should want to know the effects 1) they are having on the environment or 2) others are having on the environments that are central to their businesses from an economic perspective (Informant #11, 2014). The following quotes from informants below summarize perspectives about how the private sector can be involved in coastal and marine conservation moving forward.

“It [Coastal and marine governance] needs to be an alliance, the state - and the private sector also has a responsibility because they are benefiting. It’s a compromise with actually maintaining the natural resources of the country as well. And people have to be made aware that they can’t just use the resources until they all run out because yes they’re renewable, but within a time frame.” (Informant #10, 2014)

In regards to private sector engagement and investment in coastal management, “Because of a lack of resources - This is the way to start creating this sensibility in the business world, in the business mind of Dominican business man. This is the way.” (Informant #26, 2014)

If they [private companies] can help with the monitoring, education, with understanding changes that are going on and contributing knowledge to the management of these systems its in their best interest, because its what keeps people coming, it maintains healthy systems - it keeps fish in the water.” (Informant #36, 2014).

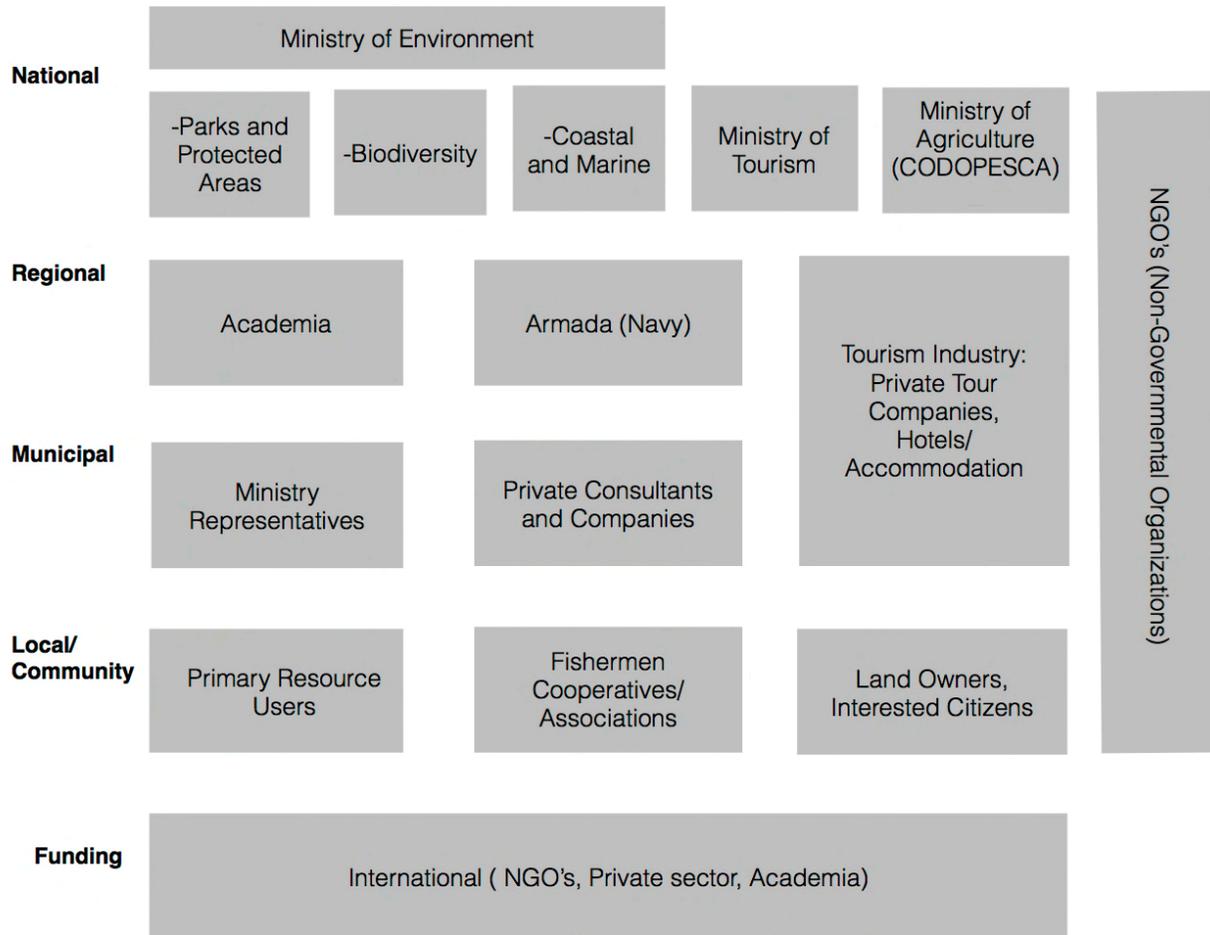


Figure 18: Current perceived governance structure of the coastal and marine conservation network in DR

### 5.5.2 Management Arrangements

As key informants spoke about environmental threats that are currently being experienced, a common recommendation or success story in achieving conservation goals was related to shared management or co-management (n=12, Table 7). Community involvement and shifting of responsibility for conservation management, such as co-management, will be discussed here.

### 5.5.3 Community Involvement

Local involvement of community members in the decision making process was investigated by asking key informants about their experience and knowledge of projects that include community participation, engagement, and education. All local key informants (n=6) mentioned that themselves as community members, or the communities in which they work, are interested in being involved the decision making process. However, there remained dissatisfaction with the amount of involvement. For example, a local resource user states that local community members seem to only be engaged during short term projects that are either being led by government or NGO's (Informant #18, 2014). This may be due some organizations having community inclusion within their mandate or within their project, however comments from the local level include the need for long-term presence within coastal communities is necessary. This includes researchers, NGO's, and especially government representatives. Researchers and NGO workers comment on having transparency and the need to be immersed in the community in order to build relationships, trust and a network in which you are working (Informant #15, #16, 2014). A successful example of this is in Monticristi where Agrofronterra has built a leading association in the community after many years. However, the following quote is from the point of view of an NGO expressing the difficulties in long-term presence,

“It's difficult to motivate and get community members to take the initiative. This causes the need for assisting organizations to be involved longer than desired, which incurs costs/volunteers. If they did leave before the 'tipping point' is reached, then all of the past efforts and work with the community are at risk of going back to before the organization was involved.”

### 5.5.4 Co-Management

There was an overall consensus across sectors that communities should participate or actively be involved in management of PAs, and shared/co-management can be successful in the right hands. Examples of local stakeholders participating in management processes are given. A high level MoE staff member claims that by law, every PA in all areas must have an annual plan for operation that considers the local community (Informant #5, 2015), and under this law there is a mechanism to integrate the community, discuss problems, and accept proposals. Informants from regional, national and international scales also mentioned the importance of considering local community perspectives into the design of conservation initiatives, however there were only a few concrete examples of when this was done. Informants from the government stressed the importance of the inclusion of

local resource users perspective in projects, but never relating to the decision making process of activities or initiatives in their area. Furthermore, most examples of community involvement were short-term, small-scale education initiatives or meetings where there was no actual power for the local community to influence the decision, no formal arrangement for the inclusion and collaboration of communities in coastal and marine governance. One local stakeholder explains that if the community is engaged it occurs within the form of broad education or 1-2 workshops a year in their region and that “The community doesn’t have a seat at the table to have a representative to ensure their needs are heard.” (Informant # 18, 2015). The government likes to delegate work and projects to other organizations and groups, while still being linked to the project for recognition purposes (Informant #36, 2014). However, informants state that it is a very difficult and long process for governments to share or relinquish power and statements from local resource users and regional/national informants who identify as NGOs claim that there has been little difference for communities on the ground relating to political level commitments.

Benefits and experiences relating to shared management arrangements were discussed, particularly in La Caleta NP and Jaragua NP, and especially from NGO’s and other non-government related entities. There are currently a few cases of co-management in MPA’s or PA’s with marine components: La Caleta Marine Park (current) and Jaragua National Park (co-management not renewed since 2005). This is noticeable in Jaragua NP, because it is isolated and not a priority for other economic sectors such as tourism or industry development. NGO group Jaragua and the MoE have not renewed their co-management agreement in years (Informant #34, 2014). In other protected areas within the DR, NGO members persistently trying to obtain this arrangement in PAs across the country even after years of waiting and paperwork, as in La Caleta NP. Although shared management arrangements are inclusive and a step towards managing humans as part of the ecological system, there still exist some limitations to this approach (see Challenges section 5.6).

#### 5.5.5 Unified Vision

Many informants felt strongly that overall stakeholders currently lack an structure or vision for coastal and marine conservation within the country (n=23, Table 7). One informant spoke to the lack of awareness of resource users (fishers, farmers) on the value of the Protected Area in their region. He believed that creating a shared vision of resource management will help include and educate local community members on the importance of conservation initiatives (Informant #2 and #15, 2014). Another key informant’s perspective relates to their experiences with the Ministry of Environment structure, and that promising projects for marine and coastal management never come to fruition (as mentioned in Challenges section). She shared that either reports and recommendations are made and

nothing comes of it, or the project is never completed. Finally she revealed her frustrations about the projects she had worked on and wasn't able to finish, " There didn't exist a vision. The government and institutional structure wasn't defined."(Informant #30, 2014). A lack of vision also exists between and within stakeholder groups, for example with the Ministry of Tourism and the Ministry of the Environment, and between the Vice ministry of Coastal and Marine resources and CODOPESCA. One informant claims that these organizations have many misunderstandings, don't work well together and "sometimes they don't have the same vision." (Informant #12, 2014).

## 5.6 Challenges

Over 1/3 (36%) of total coded responses were related to challenges or limitations of the current way marine and coastal conservation is functioning in the country. Comments relating to challenges were organized into 4 sections, among these sections, government-related challenges was the most frequent responses (Table 8).

Table 8: Challenges to marine and coastal management identified by key informants during interviews.

	<b>Number of time informants referenced this topic</b>	<b>Percentage of total coded responses</b>	<b>Selected Informant Responses</b>
<b>2.5.1 Capacity</b>	7	0.99	"You would have to help the community, help the government regulate. You need the community as an effective, motivated partner to create that capacity." (Informant #15, 2014).
<b>2.5.2 Education and Training</b>	37	5.21	" [Marine conservation is] Very difficult to non-existent, due to the low education level and poverty of the community. " (Informant #22, 2014).
<b>2.5.3 Financing</b>	27	3.80	"In theory, this [National fund] was designed so that the larger parks can help contribute to the budgets of

			smaller parks.” However, both the park managers that were interviewed claim that they never see any money from that fund to put towards park maintenance, or other upkeep expenses (Informant #6 & #20, 2014)
<b>2.5.4 Government Related</b>	186	26.20	“If you want to make things happen, you have to put your own resources.” (Informant #2, 2014)
<b>Total</b>	<b>257</b>	<b>36.20</b>	

Source: NVIVO results

#### 5.6.1 Capacity

Capacity<sup>12</sup> limitations within the DR were documented in the key informant interviews primarily by communities and government informants (n=7, Table 8). Key informant #6 highlights the lack of basic education as a challenge at the local level with community members. Specifically In one case where local resource users were given small business opportunities, but it was seen that they lacked a lot in management, administration and leadership skills which limits livelihood opportunities (Informant #6, 2014). Additionally, many informants responded that government capacity was a direct limitation to what they were trying to accomplish (see table x informant response). Additionally, it was mentioned that achieving environmental connectivity with Haiti is hindered by their capacity due to social, political and economical factors. Since these comments are mirrored in other categories, they will not be discussed further here.

#### 5.6.2 Education and Training

This section consists of comments relating to community, government staff (Includes government-related education and training challenges from section 1.5.4), academic/research, and tourism sectors (n=37, Table 8).

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<sup>12</sup> Capacity limitations such as lack of resources (funding, personnel, lack of community or government will and leadership, etc.)

### *5.6.2.1 Key informant comments related to local resource users and business owners*

Community based limitations included a generally low level of education found in fishermen, rice farmers, tour operators and boat captains. Lack of education, from basic literacy, to no experience with small business operation, was identified by many informants as barriers to conservation success in marine and coastal areas. One informant expressed this education challenge as: “I’ve noticed with the fishermen it is really difficult to have them cooperate when they don’t see the benefits in the short term” (Informant #24, 2014). Other informants from the Marina de Guerra and local NGO’s recognized that subsistence resource users (fishermen, rice farmers) do not share the overall long term vision of conservation and only think for the moment (Informant #28 & #22, 2014).

### *5.6.2.2 Ministry of Environment Staff*

Due to the multiple scales that Ministry of Environment staff can work at, there are many specific education and training limitations for this sector (n=37, Table 8). In general, informants suggested staff were not prepared or educated with environmental issues, and especially not for marine related duties or work: “There is a weakness of qualified people” (Informant #2, 2014). For example, there were incidences of Marina de Guerra not implementing environmental law correctly and confiscating equipment without following up with any other procedure: “They were confiscating nets and burning them” (Informant #34, 2014). The second example is specific to ministry staff in PAs. One NGO informant revealed that throughout the 33 PAs with marine components, only 1 person is qualified to scuba dive (Informant #6, 2014). Since scuba diving is an important way to research and monitor marine habitats the informant frustrated at the lack of qualified staff: “our rangers are not prepared for marine enforcement. They do not dive, we have a boat but it’s hard to get fuel” (Informant #18, 2014). Currently, there is word from a MoE informant that an old university campus in the middle of the country is under consideration to be transformed into a Ministry of Environment training school. This would hopefully assist with the persisting issue of unqualified individuals working both at the main Santo Domingo office and in the field, as it would allow staff to prepare to work in any/all MoE positions (Informant #26, 2014).

### *5.6.2.3 Academic and post secondary studies*

Researchers from CIBIMA (Centro de Investigaciones de Biología Marina) revealed that marine studies are not prevalent in the Dominican Republic despite the plentiful marine and coastal ecosystems and their value to the nation. A high level MoE staff supported this sentiment, saying: “There isn’t the level of education, in the marine field. There is very little interest in this field, as well as biology. It’s very rigorous work. So people prefer zoology or

botany, but we don't have a lot of higher level education options in their area. If they [students] have opportunities to go elsewhere, in most cases they will study abroad and they will not come back" (Informant #10, 2014). Out of all the people working within the marine and coastal network in the DR, only 2 have PhDs and very few have Masters degrees and these people are unlikely to work within the Ministry because there are not education standards for MoE positions (Informant #6, 2014; Personal Communication, 2014).

#### *5.6.2.4 Target audience of outreach and environmental education*

Many education initiatives or workshops led in communities by NGO's and government entities, are directed towards the resource user such as fishermen and boat owners; however, an interesting gap was identified during the interview process that identifies an additional group where education should be targeted. The latter will be focused on in this section. Tourists and tour operators were identified by informants who work directly with or within the tourism sector. Initially this idea came about within the whale tourism industry in Samana, but was also mentioned by other stakeholders in other tourism based industries such as diving and snorkeling tours, mangrove or boat tours, and even all inclusive resort guests (Informant #21, #24 and #17, 2014). Ideally, education and outreach initiatives for tour operators and tourists could be led by the Ministry of Tourism in partnership with tour operators and could potentially be supported by regulations in the future to hold tour operators and companies accountable for the education of tourists (Informant #21, 2014). This key informant has worked in the whale tourism industry for 30 years in Samana and owns one of the few companies that provide an educational experience on the tours. During the interview, Informant #21 shed light on the importance of having educated staff and tourists, which ultimately aids in the protection of the whales. Informant #21 (2014) also revealed her experiences many frustrations from the tour operators linked with all inclusive tourism who are just trying to get as many people through the tour as possible and are not concerned with the quality of the tour.

#### 5.6.3 Financing

Key informants mentioned financially-related challenges to marine and coastal management in 3 main areas: current national financial project; finances for co-management arrangements; and a terrestrial example of a functioning finance mechanism (n=27, Table 8). The current PA financing system is comprised of one national fund for PAs within the country where all the earnings from National PAs, and of which the budget for PAs is decided. In general, all PAs have access to the fund despite certain parks generating more earnings than others. One current financial project led by the Ministry of the Environment called the "Re-engineering of National Protected Area System", involves going through and redistributing resources, as some parks do not have tourism to supplement PA

earnings. In some areas, the new payment system for park entrance fees involves giving park visitors bracelets in order to have visual control and more accurately determine visitation counts. The MoE are currently working on the planning and execution of this project in coming years and the system has already been implemented in 3+ areas (Informant #3, 2014). Informant #6 highlighted the need for a new financial systems for PAs because the current system is not functioning as it was designed. Informant #6's PA is meant to receive funding from the National Fund for management and upkeep of his PA. Initially the agreement between the PA and the MoE was equal sharing of the funding made from the park, but then was amended by MoE so 80% of the funds were 'accessible'<sup>13</sup> to the PA, but only via a written request to the MoE. This PA manager stated that through both fund sharing systems: "we didn't get those funds -so that's illegal- the contract said we were getting [supposed to get] those funds" (Informant #6, 2014).

Shared management, such as co-management, now exists for institutional arrangements between the government and NGOs or private sector, and this structure assists in lobbying for funding, as well as assuring that any funding PAs receive is used towards the PA goals. Co-management arrangements are also often more beneficial to surrounding communities, as local concerns are better voiced and agreements to share park earnings are common (e.g. via park fees)(Informant #1, 2014). However, once shared management is established, the transmission of funding from tourist to government to local communities seems to be inefficient due to bureaucratic limitations. One ministry staff member described it as a very long process, and that obtaining money on time is difficult, even if it is within the department budget (Informant #2 & #34, 2014). Co-managers and even ministry staff highlighted examples of Ministry of Environment (MoE) and NGO staff members paying out of pocket to cover park expenses, such as fuel, a GPS unit, or to do an education event with a certain group (Informant #2, 2014). For example, the whale season in Samana makes 6 million pesos per season and one informant suggests that if 3 million was reinvested back into the PA, it could function more effectively: "If I had some of the money from the whale season, I would be able to do my job more effectively" (Informant #20, 2014).

Finally, an example of a widely known success story in DR is for a terrestrial PA in DR. The management and financing of this PA is effective likely due to the co-management arrangement with a local community association (Informant #3, 2014). The park fee is split between the government and the community, in lieu of going directly into the national fund. This mechanism allows some money to stay within the park, and benefits to go to the local community (Informant #3, 2014; Personal Communication, 2014).

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<sup>13</sup> Although the MoE made more funds available to PAs, MoE has yet to distribute any of these funds after they have been requested (Informant #6 & #34, 2014).

#### 5.6.4 Government related

The majority of comments referring to or discussing limitations and challenges to coastal and marine management were government-related. Among government-related limitations/barriers, at least 25% of coded responses were related to government related limitations (n=206, Table 10). Government related can be summarized by one informant's statement: "Despite 33% of areas being 'protected', many things are lacking. It's very very weak the system, the national system. The national system of PAs is a weakness of the sector because they are huge areas and only have a few technicians working there and a small number of worker or guards. So they have no personnel, no budget, no purposes. No management plans." (Informant #13, 2014). Based on the number of key informants who commented on a limitation (not by the total number of comments for that section as certain informants may have had multiple things to say) lack of interest, support, priorities, presence or motivation; lack of authority or enforcement; resources, staff; and coordination between and within levels of government were the challenges identified by at least 10 key informants (listed in Table 9).

##### 5.6.4.1 *Lack of interest, support, priorities, presence or motivation*

The overall lack of support towards coastal and marine initiatives (n=21) was the top category within the broader suite of government-related challenges that informants commented on (see also Box 2.0). The most consistently voiced reason for the 'lack of interest' towards coastal and marine conservation initiatives, such as PA management, comments was due to the transitory nature of the ministers and vice ministers, specifically within the Ministry of Environment. These positions are filled by the President, change frequently and are filled by individuals who do not necessarily have a background in environmental matters. In the past the Minister of the Environment position has been filled by a medical doctor, and currently is an individual from the Navy who is extremely disliked throughout the country (Informant #34 & #13, 2014). The interest and motivation of the MoE impacts the political will that is felt throughout the country. Initiatives involving the environment "must be a political decision and a political investment" (Informant #1, 2014). Motivation and presence is also lacking at the local and regional levels, with MoE staff, NGOs, and local stakeholders frequently commenting that CODOPESCA and MoE representatives are rarely present in the coastal communities of which they work (or are responsible), or need to have a more consistent presence (Informant #17 & #16, 2014). One informant explains where government employees' priorities lie:

"The main problem is not lack of capacity, it is, but it could be solved within the ministry. Most ministry positions are just (political) party people and their main interest is to cash a cheque at the end of the month with the least inconvenience to them. There is lot of incentive to ignore issues and cover up extra work." (Informant #20, 2014).

### **BOX 2.0 The reality of enforcement**

This story, told by a long time whale tourism operator (Informant #21, 2014), is pertinent to understanding the relationships between enforcement agencies and local community members.

“When you involve government, you involve a lot of bureaucracy and therefore, you involve politics.” The informant begins. Then continues to describes her long experience in whale tourism in Samana: “The system works like this, when a boat is out whale watching and a captain gets too close to a whale or there’s 5 boats watching instead of 3 or there is another violation of the regulations the inspector on the water at the time should: 1) Control the situation 2) File a report regarding the violation to the MoE’s local office in the evening. The MoE staff then writes a report to the Navy. Since every boat has to have a dispatch from the navy in order to leave or return to the marina, they are the only institution that can control the behaviour of boats with a Dominican flag (All whale watching vessels should have permits and a Dominican flag, however many do not have permits and some even fly other countries flags). The next morning the boat that had the violation should not receive a dispatch to go out. The sanction is to miss a day of work by not being able to take tourists out on the water. Depending on the sanction, your boat could be suspended from a day to a week, instead of fees.”

The informant clarifies again that one of the biggest problems in the whale tourism industry in DR is ensuring that the sanctions are given and highlights a common example, “The commandant this winter didn’t want to put himself in the position where he was stopping whale watchers from going out. Even small boats that do not have permits are going whale watching with paying customers and everyone with a boat is taking tourists out. In many other cases, the Navy officer manning the dispatch hears the pleas of the local fisherman who are begging not to suspend their boat because they are a father of X amount of children and they are the only person who makes money in their family, eventually playing the guilt card and appeal to the nature of a local Dominican man. This often leads to the fishermen/captain saying “but I’m a father, I have a family to feed” and appealing to the nature of another Dominican man.” Alternatively, the Naval dispatchers and PA staff also must sanction wealthy individuals who believe they can whale watch from their own private vessels, PA staff and Naval authorities may receive threats for providing appropriate sanctions such as people calling saying ‘ I’ll see you out of a job’ and ‘Do you know who I am? Do you know who you’re talking to?’. The informant concludes that in these cases with wealthy recreational boaters, “The politicians end up supporting the people who are sanctioned and the authorities (Navy, MoE) who are charged by instituting the sanctions. So I mean that’s the problem, the laws exist; the rules and regulations are in place. It’s difficult to manage such a broad spectrum of users. It’s just a matter of getting enough government personnel in these 3 agencies (CODOPESCA, MoE and Marine de Guerra) to enforce the regulations.”

#### *5.6.4.2 Lack of authority, enforcement and monitoring*

Throughout the interviews in different parts of the country, every informant identified a weakness in *authority; enforcement or monitoring* related to the coastal and marine sector within the areas/ sectors they work in (n=15). As previously mentioned in the Context chapter, the bodies responsible for coastal and marine authority, enforcement and monitoring are the Navy (Marina de Guerra), MoE, and CODOPESCA (within the ministry of agriculture (MoA)). The key informant I spoke to from the Navy was a volunteer, and described his perspective of marine enforcement: “The Marina De Guerra is supposed to act, but if it happens at sea they don’t have the money for the gasoline to go out to tell someone that they are not supposed to take the lobster for example (if it’s not in season). There are no resources, its part of the fault. There are no resources.” (Informant #28, 2014).

The Navy has a few bases, but is otherwise volunteer-based with civilians who have limited authority but who own boats and have undergone basic training (Informants #28, 2014). Generally, officially employed individuals in the Navy seem to lack both the interest and the resources (e.g. car, petrol, boat, GPS units, stations, flashlights) to fulfill their due diligence regarding coastal and marine/fisheries environmental law enforcement (Informant #1, 2014).

This was also noted in numerous other studies; that the DR lacks the capability for monitoring (Mateo and Haughton, 2004; Wieglus et al., 2010). This is mirrored by comments from study informants that the regulations exist, but “more enforcement needs to happen” (Informant #19, 2014), and “There isn’t enough vigilance, there needs to be more presence of authority” (Informant # 34, 2014). However additional comments were also made specifically towards the inadequacy of CODOPESCA laws (Informant #25, 2014) where the regulations to prevent fishing with small net size are not adequate and there are no controls from anyone for respecting closed seasons (Informant #34 & #19, 2014).

#### *5.6.4.3 Inadequate resources*

Many informants comments regarding the government ranged from the lack of authority and enforcement to inadequate resources (n=15), as seen the previous section. Resources can mean funding (budget), equipment (petrol), and/or staff (education/training level and quantity) that are needed to effectively implement management plans and/or conservation directives. Lack of MoE supplied resources can result in MoE staff paying for resources (such as petrol) in order to complete tasks that should be supported by resources from the MoE budget. One informant suggested that occasionally resources are necessary to perform workshops there is evidence that the actions are helpful (Informant #26, 2014). However, this particular informant also commented that “resources are scarce and it’s really hard to move forward with what the law mandates. It’s really hard”.

#### *5.6.4.4 Coordination between and within government*

One example highlighting this disconnected relationship is during an encounter with a MoT staff member during an interview in a PA on beach/marine quality for an international documentary. The MoT staff member had no idea of the dire condition of many marine resources within DR waters and was extremely unaware of the environmental realities currently facing the tourism industry in DR (Personal Communication, 2014). This was the first insight into the lack of communication between scales and ministries between government. Additionally, one PA in the DR is technically ‘owned’ and managed by the MoT, and considered to be outside of the SINAP (Informant #3, 2014). These examples indicate

reasons how CODOPESCA and MOE do not work well together (Informant #15, 2014). The main office in Santo Domingo needs to ensure a way to better communicate and collaborate with the MoT, and make staff in local positions accountable and vice versa.

Table 9: Specific government related challenges

	# of Key informants who commented	# of comments (codes)
Coordination between levels of government	12	15
Ineffective management, or management plan	4	4
Insufficient regulations	7	10
Lack of interest, support, priorities, presence or motivation	21	50
Lack of authority or enforcement	15	32
Local perceptions, compliance, conflicts	7	13
NGO and international designations	8	12
Paper parks	8	18
Power, status	5	5
Resources, staff	15	28
Scaling up and replicability	3	5
Turnover of government	8	11
Unfinished projects	2	3
<b>Total</b>	<b>115</b>	<b>206</b>

Source: NVIVO results

## 5.7 Recommendations for effective conservation and management

Many of the recommendations offered by informants listed here address limitations or challenges that are currently being experienced by coastal and marine stakeholders. From all related comments given within the key informant interviews (n=60), 7 recommendations for coordinating coastal and marine conservation and promoting more effective management emerged from the transcripts (see Table 11).

Table 10: Recommendations for effective management.

	Number of times informants referenced this topic	Percentage of total coded responses	Selected Informant Responses
<b>2.6.1</b> Decentralizing Power*	60 <sup>14</sup>	8.45	
<b>2.6.2</b> Education	6		
<b>2.6.3</b> Climate Change Adaptation	4		
<b>2.6.4</b> Pressure Government*	12		
<b>2.6.5</b> Promote Connections between stakeholders	8		
<b>2.6.6</b> Responsible alternatives to tourism*	8 5		
<b>2.6.7</b> Unified Strategy			
<i>*Most coded themes within this category</i>			

Source: NVIVO results

### 5.7.1 Decentralizing Power

Decentralizing power can allow for communities to have an increased role in the conservation and management of coastal and marine natural resources as well as habitats in their region (Arceo et al., 2013). Having projects and PAs decentralized are generally seen as beneficial because it would allow stakeholders (primary resource users) and organizations (NGOs) on the ground to work closer with their unique site-specific factors, and allow for more effective management. There were numerous comments by multiple informants saying that communication back and forth from the Santo Domingo office to the

<sup>14</sup> The total of 60 comments include 2 additional sections with 17 additional comments relating to current recommendations and opportunities within the recommendation category.

field is not effective or efficient. As discussed in previous sections, there is value in increasing the power of communities in conservation.

Decentralizing power from the MoE for marine and coastal conservation efforts could mean increasing community involvement, such as implementing a co-management framework in PAs so primary resource users like fishermen are more included in the process (Informant #23, 2014). If involved with the conservation process, primary resource users state they would push for real change on the ground. Examples include, conserving fish populations by ensuring a gill net ban, setting strict size and species limits, establishing and enforcing more human waste laws, and making responsible tourism practices a higher priority for coastal areas (Informant #18 & #19, 2014). Additionally, a long time Ministry of Environment staff member gives insight on how PA management could be more effective going forward: “The community could be involved more formally and the ministry could be more supportive as there is little motivation for the community to help if it doesn’t benefit them. The ministry could promote the park to receive more attention from visitors, thereby benefitting everyone by bringing in more visitors and jobs.” (Informant #33, 2014). Additionally, co-management and the devolution of marine conservation responsibilities (power) from the central government can also be given to NGOs, or other entities, capable of taking on a leadership role within the areas they work. This could be with monitoring, enforcement and education with local resource users (Informant #20, 2014). A private sector informant expresses frustrations on witnessing illegal fishing, and not being able to do anything about it: “But I mean so our boat [patrol boat for the privately owned airport] goes out there and we say that they are not allowed to fish here they can just say ‘screw you’ because we don’t have authority.” (Informant #23, 2014).

### 5.7.2 Environmental Education

Despite remarks from key informants as well as secondary literature revealing many education initiatives being delivered and supported by many different stakeholder groups in the DR, there is still a pressing need for investing in the education of community members (including primary resource users), as well as tourists throughout the coastal areas of the DR. General environmental education is needed more than once or twice a year (Informant # 17, local tourism operator, 2014), as well as more sustainable long term programs which are more likely to affect the behaviour of resource users on the ground. Some resource user groups such as fishermen have been fishing for most of their life and are quite set in their ways. One informant suggested that these individuals need to be taught the ‘new’ more sustainable ways to fish, while perhaps others can be exposed to different potential livelihood alternatives such as captains of the tour boats which use many of their skills in a different context (Informant #18, 2014). Additionally, some resource users remain oblivious to basic regulations such as seasonal laws for certain species and do not realize the impact

of certain destructive fishing strategies such as indiscriminate fishing (Informant #20 & #24, 2014). Another recommendation offered by informants for use at the local level is to assist in the transition to more sustainable livelihoods in coastal areas by offering basic business skills or workshops. As smaller towns in DR are experiencing an influx of visitors due to the development of roads and accessibility to coastal areas, there is more pressure on locals to establish businesses so they are not “eaten” by larger companies (Informant #20, 2014). However, most locals do not have adequate business education or even basic literacy; therefore, an informant who works closely with marine resource users suggests targeting education in business management: “They [local tour operators] can “move” tourists through, but don’t know what else to do or how to invest” (Informant #20, 2014).

An interesting recommendation offered by informants is to target education towards tourists (visitors) as well as the staff that are interacting with them such as tour operators, boat captains, and guides. Field observations reveal that here is currently not a focus on environmental education aspects of nature tours in Dominican. With the help of MoT, there are many improvements in the DR tourism experience that could be made to foster a sense of environmental stewardship both in country visitors, and employees within the tourism sector (Informant #6 & 21, 2014). Currently, personnel are undertrained and it is hard to make people accountable for their actions if they are unaware of the impacts they are having on coastal and marine environments (Informant #15, 2014). Another informant (#17, 2014) stresses the need for everyone partaking in similar activities and habitats to be ‘doing the same thing’, meaning outreach and training needs to be consistent.

The opportunity for MoT to be an enabling body of the responsible use of coastal and marine areas was thought by informants to be enormous. One informant explains the dynamic of current tourism regime:

“The MoT has not participated in the co-management system. They just don’t get it. They should be looking into information on board the vessel, the education aspect, information they are getting into the training guides so that there are naturalists on board and so people know what kind of whales they’re looking at when they get off the boat. Why it’s important to us [locally] and what we can all do to protect them. It happens that some boats are educational and the majority are not. It depends on the tour operator, because they run everything. The tour operators [large-scale] have the MoT in a strangle hold because they have a focus on all inclusive. So this idea that there is anything outside of mass tourism and ground operations doesn’t exist. They are taking 60-80 people on a tour instead of a quality tour where

they [visitors] are giving money and service to small businesses in town.” (Informant #21, 2014).

This comment by Informant #21 (2014) reveals the local realities of education and how regulations follow through on the ground. A shift away from all inclusive tourism, and collaboration with the MoT was suggested by this key informant in order to create a positive change for locals and marine resources in the tourism sector.

### 5.7.3 Climate change adaptation

As many key informants were working on specific projects within the country, several individuals from the study (n=2 of 5) at the international level identified the need to prepare for climate change impacts. Important recommendations relating to climate change adaptation are to restore coastal and marine habitats, and to consider assisting the most vulnerable coastal communities in DR. Specifically, informants suggest that governments need to convert their grey infrastructure (seawalls and coastal development) to green infrastructure and invest in restoring natural habitats such as riparian zones, mangroves, coral reefs, and seagrass (Informant #5, #16, & #36, 2014). These environments contribute to the country's natural resilience to climate change and there is economic incentive to ensure ecosystem services for future generations (Wielgus et al., 2010).

### 5.7.4 Pressure government

The idea of pressuring the government to make more environmentally based decisions that consider the marine environment was voiced by five informants (n=5) who see the possibilities for change within this sector. There is a need to “keep the governments’ feet to the fire” and continue to pursue certain legislations or actions for the marine environment (Informant #15, 2014). Informants identified areas for improvement, which include: modernized fishing regulations and enforcement, and holding decision makers accountable to their decisions. In order to achieve this, current fishing regulations need not only to be enforced but also to evolve, specifically relating to the ban of using gill nets and a country-wide ban on the catching and sale of parrotfish (Informant #6, #34 & 36, 2014). Bringing to an end the use of nets that are indiscriminate will assist in allowing smaller fish from being caught and increase their chance of reaching a reproductive age where they can contribute to restoring population numbers (Informant #19, 2014). An interesting statement by an international scientist working with connectivity offers the ban on parrotfish fishing in DR as an alternative way to protect marine life: “Strategic expansion of protected areas is only one way of trying to protect nature. It’s not the only way. There are other ways that can have an influence like developing policy, so having a total national ban on parrotfish would

have a huge affect on coral. Protected areas alone aren't going to solve your problems, you need to join it with other things” (Informant # 36, 2014). Moreover, informants suggested responsible fishing practices are clear throughout the nation from the local level to the international level, but now “ we have to mobilize the resources of the government and to support communities efforts” (Informant #16, 2014).

#### 5.7.5 Promote social connections

Promote connections between different groups and sectors was recommended as a way forward in marine conservation, specifically between upstream and downstream communities, as well as between NGOs, government and private sector. With the overall goal of achieving the sustainable use of marine resources a MoE staff member states: “We need to integrate all of the stakeholders and actors, and then it might work.” (Informant #5, 2014); First of all, since there has not been as much progress in implementing programs in coastal areas then in terrestrial areas, establishing connections between upstream (terrestrial) and downstream (coastal) areas may be beneficial. This may manifest in a variety of ways, however a few that were suggested include having downstream users more engaged in high level managing of resources (Informant #13, 2014); investing in upstream management and promoting connections with efforts (Informant #14, 2014) and; partners throughout the watershed to help control quality and quantity of water entering the ocean from the rivers and streams.

#### 5.7.6 Responsible alternatives to tourism

The theme of responsible livelihood alternatives was proposed by several informants, however few specific examples of how to achieve this were provided by key informants. Suggestions in some areas of the country, such as Samana, identify a need for better-trained boat captains within the tourism industry (as mentioned in other sections). Although the promotion of livelihoods that are not based around the destruction and exploitation of marine resources is an excellent recommendation, realistic opportunities need to be based on the place-based need of each community. One informant working for the MoE (Informant #4, 2014) at the national level vaguely mentioned that the MoE is trying to develop a sustainable fund for eco-tourism, and to further the protection of PAs while attracting tourists. This is a promising suggestion, however no further information on this initiative was found.

#### 5.7.7 Unified Strategy

After hearing a variety of perspectives from key informants from different areas, it was not a surprise when the recommendation of developing a unified strategy for coastal and marine conservation emerged. This idea was voiced by many informants in a variety of

ways, for example: “The main difficulty about this type of issue with natural resources is that there does not exist a large scale plan or strategy for other people to adopt. This country needs to develop a natural resource strategy. The ministry prepared a natural resource strategy twice, and we still don’t have natural resource plan. No one is moving towards it.” (Informant #30, 2014). With the dynamic nature and wide expanse of marine resources it becomes hard to focus only on a small portion of the ecosystem or habitat at a time. There is a need an overarching strategy or goal to which all stakeholders can relate and agree with. Integrated coastal ecosystem management is perhaps one of those strategies (Informant #10, 2014): “The focal point is the actual ecosystem, but since they exist in between communities it’s sometimes hard” (Informant #31, 2014).

Many of the results listed above were also supported by various secondary literatures such as organizational and governmental reports. Results closely related to the objectives of the study will be considered within the discussion.

## Chapter 6: Discussion and Recommendations

This chapter discusses the findings of the Dominican Republic case study regarding current perceptions on the effectiveness of coastal and marine conservation efforts. This chapter builds on major findings, as presented previously, and relates back to the primary objectives of the study:

*Objective 1:* Examine governance frameworks in order to assess the degree to which local resource users are considered in the decision making process for natural resource management., specifically coastal and marine conservation management such as MPAs and large scale coastal and marine connectivity initiatives.

*Objective 2:* Identify potential opportunities within social-ecological systems to reduce undesirable livelihood impacts from conservation efforts such as the establishment of marine parks or PAs.

*Objective 3:* Assess the perceptions of biodiversity conservation via conservation connectivity initiatives that reflect the Dominican Republic's commitment to increasing ecosystem protection.

*Objective 4:* Identify the barriers and opportunities to achieving sustainable coastal and marine resource use.

Additionally, lessons and observations from the study on how to effectively achieve protection of DR's coastal and marine resources (i.e. achieving a future where social ecological systems (SES) are more environmentally responsible) will be woven into the specific objectives sections below to avoid redundancy.

### **6.1 Objective 1: Examine governance frameworks in order to assess the degree to which local resource users are considered in the decision making process for natural resource management.**

Ostrom (2010) suggests that complex multi-scaled problems require governance arrangements that spans local to regional to global scales. This study found that limited efforts are currently in place to engage local stakeholders in a meaningful way with regards to coastal and marine conservation management. Moving forward, an overall a rearrangement in governance is needed as well as lessons from small-scale examples of

successful management strategies could be replicated and scaled up throughout the country. These findings are discussed below as mechanisms to increase the degree of which local stakeholders are involved in the governance process of coastal and marine conservation management.

Thus far in DR natural history management, there has been a strong presence (or dependence) and influence from international actors and organizations, facilitated by the central government. There was a broad agreement across informants that reliance on central government agendas and international funding for coastal and marine resource management must shift to directly encompass the values of DR's citizens for a true transition into sustainability. For example, a shift to more inclusive MPA governance structures will foster sustainable development and create livelihood opportunities suitable to the country's conservation values. This is mirrored in the literature by authors such as Brondizio et al. (p.33, 2009) who summarize the cross scale structure they feel is necessary for coastal and marine conservation:

“We point the need to recognize the multi-level nature of (coastal and marine) problems and the role of institutions in facilitating cross-level environmental governance as an important form of social capital that is essential for the long term protection of ecosystems and the well-being of different populations...Institutions facilitating cross-level environmental governance become an important form of social capital.”

#### 6.1.1 Paths to Sustainability: inclusive governance

Inclusive governance and participatory approaches (e.g. co-management) were seen by key informants as a way to address the limitations and barriers commonly seen in marine and coastal management in developing countries. Sales et al. (2007) identify lack of surveillance, weak institutions, unclear legal management instruments, and limited involvement of fishers in coastal management as common limitations, and these were also found in the research for this thesis. As mentioned in the previous chapter, numerous informants mentioned that a greater commitment to using both ecosystem and participatory approaches would be helpful in DR's conservation efforts. This aligns closely with much of the developing country conservation literature (see for example Torres and Ulloa, N.D; Olds et al., 2012; Bustamante et al., 2014; Juffe-Bignoli et al., 2014; Long et al., 2015). Based on the complex nature of natural resource management in the Dominican Republic, the integration of an inclusive multi-scalar governance structure within the country's natural resource sectors should be considered to facilitate the transition towards a more

sustainable future. DR is currently involved in some innovative initiatives, but a new governance framework for coastal and marine related conservation that supports participatory management would allow for more effective management of the resources of these ecosystems.

#### 6.1.2 Examples of inclusive governance arrangements in the Dominican Republic (DR)

Informants suggest co-management as a governance strategy to address some of the current marine and coastal management issues, such as lack of community and participatory approaches. A variety of informants from different scales and sectors mentioned the importance of considering local community perspectives in the design of conservation initiatives, mentioning a small number of concrete examples. Firstly, some environmental organizations and groups were reported by informants as including a variety of stakeholders, including local representatives, on their boards or project teams. Secondly, informants reported that some NGOs who are closely associated with a PA pressured the government to share responsibility and power (i.e. co-management) and to include local stakeholders in the management process. Despite these encouraging examples, informants reported that the Minister holds all the decision making power, and even if there is a strong local or Ministry (e.g. technical team) opinion, the Minister can still override the decision. A shift to more inclusive governance strategies will assist in making the voices and priorities of all stakeholder groups heard and in effecting change. The research suggests the lack of an inclusive governance framework within coastal and marine conservation networks in the DR is the central issue driving many of the barriers described by key informants.

Within the DR, small scale inclusive governance structures have been successful in managing and conserving valuable natural resources, and thus facilitating DR's transition into sustainable coastal and marine resource use. In the case of La Caleta, the inclusion of local stakeholders (i.e. primary resource users such as fishermen) in the decision-making and management process of valued marine resources was done more effectively through a co-management strategy between Reef Check, a National NGO, and the central government compared to efforts from the government alone. This management process has shown great opportunity for local resource users as well as measurable environmental improvements, increased compliance, and increased opportunities for alternative non-extractive income sources (Informant #6, 2014). Inclusive governance structures and participatory management strategies such as co-management are steps in the right direction for managing coastal and marine resources. However, the success of conservation initiatives in the coastal and marine conservation zone remains limited by the DR government's mostly-centralized management process, priorities, and interests.

## **6.2 Objective 2: Identify potential opportunities within social-ecological systems to reduce undesired livelihood impacts from conservation efforts such as the establishment of marine parks or PAs.**

The establishment of coastal and marine conservation initiatives, such as MPAs, can allow for social benefits to local communities through the recognition and integration of local priorities into a holistic MPA management plans. This section highlights the application of EBM strategies within DR, and gives examples of private sector involvement and responsible tourism practices, which have created responsible livelihood alternatives.

This research is consistent with recent literature which suggests that a holistic approach to governance is desired for NRM as it includes ecological and environmental considerations, a wide range of stakeholders (social), and helps to understand key factors involved in complex management (Phillips, 2003; Olds et al., 2012; Long et al., 2015). It is important to consider both humans and nature as part of the same system, such as EBM or Ecosystem Approach (Phillips, 2003; Slocombe, 2010). Integrating an ecosystem approach in PA management uses systems thinking, ideally incorporating the PA and surrounding area in order to better understand the factors involved in complex management (Slocombe, 2010). Additionally, achieving sustainable social-ecological systems often requires including and considering the livelihoods of locals that are often linked to the resources we are trying to conserve. Social benefits are therefore needed, and may include direct employment opportunities in sustainable resource based industries or stewardship payments (Worboys et al., 2010). This research highlights initiatives in La Caleta National Park and Punta Cana where methodologies are being used to incorporate local interests and priorities into managing coastal and marine areas, while working towards a profitable, environmentally responsible business model. Furthermore, most informants within this study working at higher scales (Regional, National, International) acknowledge the importance of considering humans and the environment within the same resource management system. As one key informant mentioned:

“There is an impact on fisheries [from people] because most of these people that affect the PA live outside of it - they haven’t been given an alternative to do anything else [but to fish]. We [a National NGO] have a very active interest in connecting sustaining practices to improving the environment of course, but also the livelihoods of key stakeholders.” (Informant #15, 2014).

Andrade (2012) states that the success of conservation strategies (such as PAs) is linked closely with an understanding of social-ecological systems, and my thesis research

supported this claim. Although there has been some progress in managing social–ecological factors of reef ecosystems, poverty is widespread in many countries, including the DR. As indicated through key informants in this study, establishment of PAs is not sufficient to achieve both social and environmental conservation goals. By including communities (i.e. local resource users) in management and decision-making, PA effectiveness can improve (Informant #6 & #34, 2014). Engaging the community in the governance process, as well as enabling the better representation of local stakeholders allows for the consideration of the implications that conservation initiatives can have on local livelihoods (Pinkerton, 2009).

### 6.2.1 Private sector support for coastal and marine conservation

This study suggests that private sector involvement in coastal and marine initiatives could be one possible way to reduce the negative impacts of conservation. This section discusses 3 potential mechanisms to enhance private sector involvement in the DR: 1) policy reform (payment for ecosystem services); 2) private sector (e.g. industry and NGO) collaboration; and 3) responsible tourism<sup>15</sup> opportunities.

Policy changes and implementations (such as payments for environmental services (PES)) were mentioned by numerous informants as a possibility that might help marine and coastal conservation in DR, and as a way to hold the private sector accountable for their use of the marine and coastal zones. Private sectors (i.e. industry and tourism) often have more of a financial capacity than local resource users, NGOs or governments to invest in marine and coastal conservation initiatives, often allowing local community members to be employed within business practices and initiatives. As private stakeholders are often benefiting from the condition of coastal and marine resources, policies, such as payment for ecosystem services (PES), are needed to keep private sector stakeholders accountable for their resource use (Waite et al., 2014). A PES feasibility study which investigated the value of beaches in a Colombian MPA found that beach erosion could impact the tourism sector and reduce revenues by 66% (approx. 73 million annually) as most tourists choose destinations based on quality of beaches (Castano-Isaza et al., 2015). As the tourism industry evolves, a balance must be achieved between economic benefit and the services/value of coastal and marine resources themselves. Wiegus (2010) recommends that the DR integrate this concept of PES into their decision-making for coastal and marine resources. In addition to tourism-based businesses, salt manufacturers, gas companies, and supermarkets have also been identified as possible groups to collaborate with and engage in coastal and marine initiatives (Informant #6, #34, and #15, 2014). Based on the responses

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<sup>15</sup> Responsible tourism opportunities as a recommendation for this study refers to both adopting more socially and environmentally conscious tourism practices within the existing tourism (mass) structures within the DR.

from key informants, establishing a PES system may be a potential way forward to integrate and facilitate the participation of the private sector into the DR's coastal and marine management.

There are currently a few examples of the private sector leading or taking part in coastal and marine conservation initiatives in the DR via helping to increase alternative livelihood opportunities. Although promising, the government could promote private sector involvement in coastal and marine conservation initiatives more frequently and across larger scales. Throughout the country there have been successful reports of fishermen transitioning to less extractive practices on the DR coast such as those initiated by the Punta Cana Ecological Foundation. This Foundation paired up with a local research facility to offer sustainable tourism activities, and incorporate education within the activities they offer. Furthermore, the Foundation has the potential to contribute financially to marine SES initiatives and they are known to comply with all governmental regulations and maintain trusting relationships with other coastal and marine stakeholders within the areas they work. In regards to livelihood alternatives, Punta Cana Ecological foundation efforts have led to successful reports of fishermen transitioning to less extractive practices off the DR coast.

In the DR, this study show that tourism is closely linked with coastal and marine systems, however there remains a large opportunity for this relationship to improve as to better facilitate the sustainable use of ocean resources through responsible tourism practices. Although there exists many threats to coastal and marine resources from the tourism industry, income from tourism supplies a necessary means of financing to marine conservation initiatives (Angulo-Valdes and Hatcher, 2010). Overall, in the communities visited in the Dominican Republic, and through interviews with NGO and park staff, the research revealed that resource user communities were well aware of the potential negative environmental impacts from fisheries and/or tourism effects. However, the lack of opportunity for employment opportunities within the tourism sector prevented resource users from continuing extractive or destructive work. In both La Caleta and Punta Cana cases, there needs to be support or education and support in order to assist with determining livelihood alternatives or mechanisms to assist with reducing the pressure on coastal and marine resources while providing opportunities in more responsible behaviours. The need for alternative livelihood through alternative tourism opportunities were also reported in a DR-based study by Wielgus et al. (2010, p.vi):

“Assuming a gradual increase in visitation, we estimate that fishermen could earn 90 percent of their current income over the short term through dive tourism alone. Additional income from snorkeling, kayaking, and other business opportunities

associated with the reserve should enable fishermen to earn more from tourism than from fishing over the coming years.”

In summary, this study suggests a variety of ways to conserve natural resources within marine and coastal areas, and that this will involve private sector involvement in order to transition into a sustainable future.

### **6.3 Objective 3: Assess the perceptions of biodiversity conservation via conservation connectivity initiatives that reflect the Dominican Republic’s commitment to increasing ecosystem protection.**

The ecological component of marine and coastal connectivity thinking was relatively widely known in my pool of key informants, however, while the value of social connectivity was also widely known it was identified as lacking in the current initiatives DR is leading, or participated in. This section discusses the value/role of social connectivity in effective PA management, and then discusses how social learning can be used as a technique to incorporate local priorities and strengthen social connectivity. Additionally, a summary of large-scale coastal and marine conservation initiatives will be presented.

#### 6.3.1 Social connectivity: the flow of information among people and organizations

The literature suggests that there is a high value in social networks and associated social capital<sup>16</sup> for large-scale coastal and marine conservation initiatives, and institutional connectivity seems to facilitate achieving ecological goals (Brondizio et al., 2009; Berger et al., 2010). More simply, social benefits such as coordination and collaboration between individuals, organizations and even nations plays a role in achieving conservation goals. The Conservation Planning Group (2015, para.1) comments on the value of social connectivity from their perspective: “How people are connected to each other and their connections to the environment influences the efficacy of conservation and natural resource management strategies and governance structures.”

The importance of social connectivity for coastal and marine conservation management was also recognized study by informants who gave feedback on DR’s connections to large-scale connectivity initiatives (summarized in Table 11). Social capital within large-scale

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<sup>16</sup> Refers to the connections and relationships among people in a people in a certain network or community (Brondizio et al., 2009)

connectivity initiatives can be used to link and disseminate knowledge resources and information (i.e. opportunities, lessons) across levels of social organizations and institutions within the network. Particularly for large-scale projects, Brondizio et al. (2009) identified the growing need for institutional and social connectivity within and across multiple scales. The literature observes that these social connectivity activities are usually not well coordinated and are seldom documented in ways that make them readily available or easily disseminated, which can lead to duplicate efforts and waste of resources (Fanning et al., 2009a). This study demonstrated that there is a desire for better social connectivity among stakeholders, and actors, in DR and wider Caribbean coastal and marine networks. However, there is a need for members of coastal and marine networks *within* the DR to be better recognized and endorsed by national governments so that stakeholders such as NGOs, the MoE, and park employees can actually influence management.

### 6.3.2 Social learning

Comments made by informants within this thesis indicated barriers to coastal and marine management within DR initiatives included the lack of social learning. Social learning is “a process of social change in which people learn from each other in ways that can benefit wider social-ecological systems”, and is increasingly becoming a common goal within natural resource management and policy (Reed et al., 2010). It is also known that co-management and participatory approaches, previously suggested by informants as promising for DR coastal and marine connectivity conservation initiatives, can encourage social learning and sustainable development (Muro and Jeffery, 2008).

### 6.3.3 Social learning examples that increase social connectivity in the DR

Social learning can exist at any scale, and can be promoted through a variety of techniques. The following examples of social learning are given by Brugnach et al. (2012): Involving public in a community workshop; targeting multi-lateral and multi scale stakeholders to experience research and monitoring; creating forums or committees where individuals, organizations and businesses can share perspectives and lessons relating to coastal and marine management. This study echoes similar social learning techniques as Brugnach et al. (2012), as fundamental to establishing social connectivity within marine and coastal networks and have the potential to be replicated and expanded to increase social connections in the DR

In interviews, informants mentioned various programs displaying qualities of social learning that have been beneficial for marine and coastal conservation. Mentorship programs between conservation staff have assisted NGOs like Grupo Jaragua to obtain feedback directly from resource users and conservation practitioners through a co-management

framework, and to co-create and present their feedback to decision makers in the government. Mentorship programs were seen by many informants from NGO sectors as a more practical approach to building capacity for coastal and marine conservation than typical 'education' and 'training' efforts (Informant # 6 & #8, 2014). Mentorship as a social learning strategy is useful because local resource users and workers in PAs have an opportunity to learn from other resource users and PA workers (Bustamante et al., 2014).

Informants also identified social learning techniques within the DR coastal and marine network which were ineffective. In one example, a national NGO and a MoE staff member collaborated on a management plan sponsored by UNEP, on best practices for co-management regimes for PAs in the DR. It was suggested that this project was completed due to the good working relationship between the individuals involved. This collaborative relationship fostered co-learning and co-production of knowledge, which are important characteristics of social learning (Brugnach et al., 2012). Additionally the collaborative project catalyzed the completion of the project, which was seen as unusual for marine conservation projects linked to the government (Informant #30, 2014). However, when asked about the impact of the final management plan, the authors were not sure if it was being used or had been circulated to the intended coastal and marine network audience (Informant #1 and Informant #6, 2014). The lack of structure or forum to disseminate and share project results was identified as a limitation of social learning specifically, and coastal and marine conservation initiatives more generally.

One large-scale example of a social learning forum in the Caribbean MPA community is CaMPAM (Caribbean Marine Protected Area Network and Forum). This forum facilitates the exchange of information and dissemination of best practices within the Caribbean network (Personal Communication, 2014; Spalding et al., 2007). Although this forum was cited frequently in NGO reports and coastal and marine documents, very few informants mentioned that they actively participate within the forum. This suggests the need for stronger connections within the coastal and marine conservation network of stakeholders so opportunities such as the CaMPAM forum can be shared and utilized, and the social learning opportunities maximized.

#### 6.3.4 Summary of Large Scale Coastal and Marine Initiatives

Key limitations and successes of large-scale coastal and marine conservation initiatives that the Dominican Republic are currently leading, or participating in at some capacity, are summarized briefly in this section. The most representative comments given by informants regarding these large-scale initiatives are paraphrased below in Table 11.

Table 11: Summary of limitations and successes of current large-scale connectivity areas of which the DR is a participant.

	<b>Limitations</b>	<b>Successes</b>
<b>SINAP</b>	Many PAs without management plans, or effective enforcement.	The DR now recognizes and uses a system of PAs at the National level.
<b>JBE-LS</b>	Management is lacking and/or ineffective. Knowing this, is it a valid option to expand the project across the border?	Strategically brings Haiti and DR together to discuss biodiversity conservation at the border region.
<b>CBC</b>	Slow moving, vision is too ambitious	Bring many governments and nations together to discuss environmental priorities and facilitating local actions. There are countries waiting to join the CBC.
<b>CCI/CBF</b>	DR has not signed onto the CCI at the political level.	Participating at the Technical level, collaboration and commitments for the second phase. CBF has created the potential for receiving CBF funds.
<b>CLME</b>	Effective Governance model	Success of local NGO and centralized government working together towards co-management during MCNP pilot project

Sources: Interviews; Personal Communication, 2014; Reynoso, 2011; Griffith et al., 2012; UNDP/GEF CLME Project, 2011; UN SIDS, 2014; Grupo Jaragua, 2006; MaB Workshop, 2014.

Informants who were aware of any of these large scale coastal and marine connectivity initiatives generally acknowledged the benefit of bringing together different countries with different capacities. However, few informants mentioned the need for these types of connectivity initiatives to build on social connectivity such as sharing expertise and knowledge and facilitating social and political connectivity between nations.

Key informant’s knowledge and perceptions regarding specific conservation initiatives depended on the scale at which they worked. Informants working at national or international scales were more likely to know about large-scale connectivity initiatives than were local and regional level key informants whose knowledge was generally limited to the initiatives that had specific actions, or pilot studies within the areas they worked. The variable levels of knowledge across the informants points to a need for a more comprehensive strategy to disseminate information to coastal and marine stakeholders about the projects and activities occurring within the DR and even wider Caribbean network. Also, informants reported that most dissemination efforts for large-scale initiatives have been at the local-regional level. Therefore, initiatives such as the CBC and

CLME may not be widely known past the specific areas where pilot projects exist. Lastly, in regards to the CCI, the personal commitment and actions of only a few individuals within the government (MoE) allowed for this initiative to be possible. This highlights the need for 'champions' at the political level to support the success of such large-scale programs.

Large-scale coastal and marine initiatives are important for connectivity within the Caribbean, however there remains a need to develop a shared vision within such initiatives. Due to the large-scale and often trans-boundary nature of the projects, engaging stakeholders through social networks can be challenging. As seen by the comments in Table 11, as well as from the NVIVO results, a unified vision within projects is needed for all stakeholders and informants to work towards. Key informants recognized both the ecological and social need for large-scale connectivity conservation initiatives both within country, and within the Caribbean region. In the case of the DR, there is no overall common vision for coastal and marine resources, which is seen by informants as hindering progress and success (achieving conservation goals) within initiatives, such as PAs or large-scale connectivity initiatives. One informant shared their opinion on the most powerful efforts from their perspective: "I think that all the initiatives need to come together. The most important from my point of view are the CCI and WWF. (They) are the two most important organizations working to sync the Caribbean as a whole if you're talking about conservation about marine area or biodiversity." (Informant #6, 2014).

There are many social learning approaches that could be used to build upon the successes of existing large-scale initiatives. As seen in Table 11, many successes have emerged from the large-scale connectivity initiatives that could help strengthen both national and local capacity through a variety of frameworks. Current large-scale coastal and marine initiatives within the DR have the opportunity to reach out to participating organizations and institutions with the goal of implementing social learning strategies within the geographical range in which they work. Beginning with local and regional scales, it is advisable to establish effective social learning pilot projects such as workshops, focus groups and forums for a variety of coastal and marine stakeholder groups. These should be monitored with learning feedback loops to support adaptive approaches to integrate resulting ideas, and to achieve the most successful and effective conservation results possible. Once a few programs/frameworks have shown favorable outcomes within the DR, the potential exists for these frameworks to be shared and adopted by other countries to assist with the development of similar coastal and marine protection frameworks.

#### **6.4 Objective 4: Identify the barriers and opportunities to achieving sustainable coastal and marine resource use.**

A list of key barriers and opportunities from the key informant interviews, personal communication, field notes, and secondary literature was compiled to highlight the current state of coastal and marine conservation efforts in the Dominican Republic (Table 12).

Table 12: Summary of barriers and opportunities for coastal and marine conservation initiatives in Dominican Republic

<b>Barriers</b>	<b>Opportunities</b>
Lack of overall vision is agreed on by different stakeholders. This is affected by the management process, as it is sometimes unclear and inconsistent depending on who is involved (the minister and their priorities)	Relationships and partnerships between stakeholders could be strengthened and further promoted.
Centralized governance structure (lack of government will/motivation, government funding, insufficient staff, unproductive resource allocation)	Inclusive governance arrangements (devolution of management responsibilities, co-management and participatory management)
Sustainable/long term financing (Caribbean biodiversity Fund (CBF)/ national Trust Funds, NGO projects, MPA infrastructure and maintenance)	Long-term partnerships and presence/communication with local stakeholders/resource users/public, instead of short-term engagement/ consultation during projects.
Limitation of resources: Less than half of DR PAs have staff on the ground, for either enforcement or for implementation of a management plan.	Expanding and up scaling collaborative management models (co-management agreements, enhancing connectivity)
Poor relations between Ministries (MoT, MoE, and MoA)	Long term presence in select regions
Management planning and information (Most PAs in the Dominican do not have a management plan)	Private sector involvement
Trans-boundary initiatives are necessary, but very difficult to unite stakeholders to work together towards common conservation goals (language, legacy, government does not want to share power)	Knowledge sharing platforms (for multinational sharing of expertise and information dissemination e.g. CAMPAM)
Government capacity and turnover	Balancing focus from forestry -> Marine Government Leadership
Dependence on international support/funding	Addressing trans-boundary resource concerns

## **6.5 Recommendation Summary**

To summarize, the recommendations of this study are based on the findings within each of the research objectives are stated below.

- The use of inclusive governance structures to facilitate local resource user participation. The knowledge and concerns of coastal community stakeholders must be considered to ensure effective protection.
- Increase non-centralized institutions to support for coastal and marine conservation initiatives (policy reform, collaboration with private sector, and creation of responsible tourism opportunities
- Increase and expand social learning initiatives to strengthen social connectivity in large-scale coastal and marine connectivity initiatives in particular.

## **Chapter 7**

### **Reconciling Social ecological systems in coastal and marine environments**

#### **7.1 Research Outcomes**

##### **7.1.1 Implications for the Global Community**

There are a number of potential implications of this research for academia and the conservation community. The research provides a baseline for multi-stakeholder perspectives on coastal and marine conservation efforts in DR. By developing a baseline on current interactions of marine resource users in coastal communities in the DR, it will be possible to gain insight on the relationship between resource users and coastal and marine conservation areas within and beyond the borders of conservations initiatives in the Dominican Republic. The research also provides insights into the need for a strengthened role for stakeholders in MPA management processes, and the potential to support more sustainable alternative livelihoods whenever MPAs are proposed, established, extended, or implemented, or even when isolated MPA's are linked into a larger conservation system. The research has uncovered barriers and opportunities related to established conservation initiatives in the DR, and this will be valuable when designing future opportunities for marine conservation. This has the potential to be important in increasing marine protection and management effectiveness within the DR, in the other countries participating in large-scale initiatives (CLME, CCI, CBC), and even other countries within the Caribbean.

The research also identified additional key findings. The perceived value of stakeholder collaboration and involvement in MPA management was a key finding, and this finding may have implications for some of the participating organizations and countries which may not have a budget to allocate funds towards research. This study will also add to existing evidence in support of increasing marine protection, and may help inform future large scale coastal and marine connectivity initiatives, especially as these relate to stakeholder involvement. The study's examination of DR's experiences with marine conservation also has great potential to help inform the development of similar marine protection frameworks in nations with similar social, political, or environmental characteristics, such as countries in the wider Caribbean (e.g. Jamaica, Cuba, Haiti).

#### **7.2 Further Research Needs**

This study suggests that additional research is needed to address existing marine and coastal governance limitations, and research needs revealed in this thesis include: social network analysis, and; governance evaluation. Increased knowledge in these areas for coastal and marine networks and policies within the DR would assist in targeting specific stakeholder connections and policies that may currently be limiting the success and

effective implementation of coastal and marine conservation efforts, such as the large scale connectivity initiatives discussed in this thesis.

### 7.2.1 Social Network Analysis and Governance Evaluation

To accomplish the current conservation goals of maintaining marine biodiversity an increased global effort in establishing MPA's is needed. In order to obtain long lasting benefits, and for these initiatives to be successful, both scientists and management authorities must learn how to work closely with coastal communities. This is necessary to ensure both sustained ecosystem health and continual resources for local stakeholders. From a nation-wide standpoint, a possible way forward would be to determine the specific connections and information flow between and among stakeholders in the Dominican Republic coastal and marine management network. A type of social network analysis would gain further understanding in regards to the relationships between relevant stakeholders in coastal and marine governance. As determined from interviews certain connections required for inclusive governance structure are weak or absent in the coastal and marine social network in DR. This would build off the results from this thesis and further investigate specific ways the DR can be more effective in achieving their commitments to coastal and marine conservation.

Secondly, to further identify specific barriers, challenges and opportunities for each protected area, respectively; I would suggest conducting a country-wide socioeconomic and governance assessment/evaluation. Governance frameworks should include components of "good" governance as outlined by Folke et al. (2005) within this framework based on varying contexts at different scales. A governance or institutional analysis is common in investigating governance effectiveness and social connectivity between networks (Berkes and Folke, 1998; Gardner, 2015). For example, this approach was taken within a PA in the southern Caribbean where surveys were conducted to gain insight into the following categories (Camargo, 2009): Local marine resource use patterns and socioeconomic conditions; effect on resources; formal and informal knowledge about resources; leadership in environmental management; and values associated to the PA or coastal/marine resource. The categories within governance were the following: institutions, administrative resources, and existence and knowledge of a management plan; scientific research; legislation, norms, rules and enforcement; resource conflict; and participation.

## 7.3 Conclusion

The conservation and management of coastal and marine resources in the Dominican Republic requires increased attention from many different sectors and across a variety of scales. *The research question guiding this study is: "Are current commitments and*

*management efforts to conserve coastal and marine resources effective? And In the future, how can DR better address coastal and marine management?”*. This study highlights the contribution of coastal and marine ecosystems to the DR and its people, and the need for greater investment in protecting these ecosystems, including better management of marine fisheries, more effective protection of existing reserves, and enforcement of coastal development guidelines. Additionally, trans-boundary initiatives are necessary for coastal and marine biodiversity conservation, but in practice, it appears to be very difficult to unite stakeholders to work together towards common conservation goals. Worboys describes connectivity conservation as a “big thinking response” designed to face current challenges facing the environment since small, isolated conservation efforts (i.e. PAs) are not sufficient to ensure species conservation. However, one of the main themes revealed through this thesis is the parallel importance of using social connectivity in order to achieve effective conservation.

Figure 21 depicts initial themes or objectives (sustainable livelihoods, ecological connectivity and inclusive government) of the study are on the left side of the figure, followed by emerging themes (responsible tourism, social connectivity, and devolution of management responsibilities) on the right. The arrows in the middle depict the relationship that became apparent throughout the research. 1) Sustainable livelihoods have the opportunity to be linked with responsible tourism practices; this involves the consideration of incentives and private sector involvement (funding/ alternative livelihood opportunities). 2) Initially large-scale marine limitations inherently plan for ecological connectivity; however; this study suggests that to ensure LSMI are effective, social connectivity is an important consideration in planning and implementation. Therefore, social connectivity assists in achieving ecological connectivity. 3) The notion of inclusive governance in the DR developed into the recommendation of many informants to not only include local stakeholders in the decision making process, but in some cases to devolve some of the central governments power and allow for other institutions or groups to be responsible for marine and coastal management. Co-management and participatory approaches were highlighted as potential mechanisms for other groups other than the government to be accountable for conservation goals.

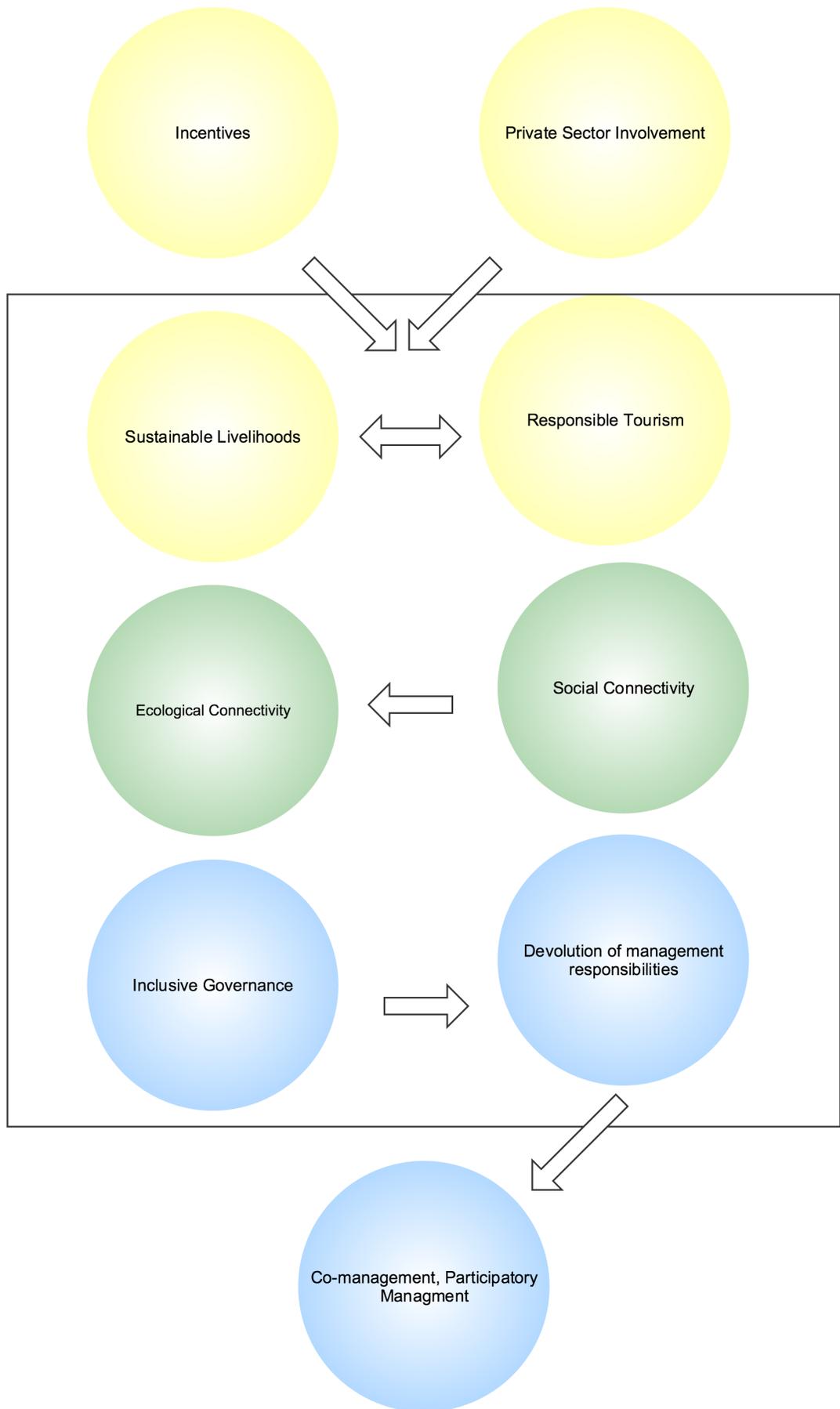


Figure 19: Relationship between the major themes of the thesis. Source: Interview Data. The Dominican Republic (DR) lies within one of the world's biodiversity hotspots, and because its citizens have a strong dependence on marine natural resources it is critical to design marine resource management systems that can ensure sustainability. Although the benefits and services of these systems are numerous, they are often overlooked in development and policy decisions (Wielgus et al., 2010). Protecting coastal ecosystems will help to sustain fisheries, improve biodiversity, and enhance other ecosystem services (Weigel et al., 2014). Socio-ecological systems are interconnected and the current rate of natural resource consumption in DR, such as within fisheries and coastal development, is unsustainable. Both overexploitation of coastal and marine ecosystems and the use of destructive fishing practices are contributing to the collapse of highly coveted marine resources in many regions of the DR. The degradation of these resources is a threat to local livelihoods and National gross domestic product (GDP), as most industries in the DR rely on coastal and marine ecosystem functions and services. Marine areas around the border zone of Hispaniola Island are subject to extremely high fishing pressures from communities within both the Dominican Republic and Haiti. Additionally, a large portion of the country's subsistence based livelihoods are directly linked to having access to marine resources. In order to secure these resources for future generations, this research has suggested that a transformation must occur on how the DR government regards and manages marine resources. I believe this transformation will be possible through a restructuring of the part of the DR governance system that connects to marine and coastal resources. Lastly, the compounding factor of climate change and uncertainty must be considered in addition to human behavior as fish distribution and species migration will play a role in how resources are protected and managed.

To consider trade-offs such as sustainable livelihood alternatives and support of conservation initiatives, an appropriate framework must exist to encompass the needs of coastal inhabitants to assist in adapting to new roles and conservation initiatives that are being put in place, i.e. establishment of MPA's. As Fanning et al. points out (2009a, p.225): "EBM or any other kind of management cannot be pursued effectively unless governance institutions are in place and operational" With some difficulty, strong willed NGOs have sought out co-management agreements for managing PAs in the DR and are considered a best practice or "model" method for coastal and marine management. Having local community members being engaged in both the decision making process for managing natural resources is an emerging governance type for social ecological systems. The DR has a few examples but this model needs to be expanded to other regions of the island and implemented at larger scales. The lone establishment of protected areas (PA) is not adequate and often do not include comprehensive and holistic management; therefore, trans-boundary initiatives are necessary but very difficult to unite stakeholders to work together towards common conservation goals. As "The New Parks Paradigm" suggests, this

research confirms that one of the critical reflections of operating within a modern conservation paradigm is the devolution of power from centralized institutions, as well as stakeholder participation and community involvement (Phillips, 2003).

Despite impressive environmental laws and an extensive network of protected areas, at least on paper, the research revealed that political will in DR seems to be lacking, and cannot ensure substantial efforts are taking place and being followed through with on the ground (local and regional level). Research suggests that non-centralized institutions could play a more meaningful and effective role in coastal and marine management. Through the diverse interviews, a common vision emerged - that in order for conservation initiatives and marine resource management to be successful, a working relationship or collaborative effort which considers diverse stakeholder perspectives is necessary, as well as appropriate stakeholder incentives and long term partnerships. The findings of this thesis are supported by other researchers working in a Caribbean context, including Fanning et al. (2009a) and (Lopez-Angarita et al., 2013) who determined the need for a more collaborative mechanism or governance arrangement to manage coastal and marine resources. The Dominican Republic has currently met many marine conservation goals, and will likely continue to meet their goals in the future. However, the effectiveness of the varying scales of initiatives they participate in remains unclear, as there exists many governmental and social ecological challenges with the implementation, management and enforcement of these efforts. Additionally, the need for a better connected multi-scalar and cross sectoral coastal and marine network throughout the country would be helpful to ensure active collaboration, dissemination and co-production of knowledge, as well as the ability to create a unified vision for marine resource management. The research in this thesis reveals that the Dominican Republic has an immense potential to be a regional leader in marine conservation and protected area management, and can achieve this potential by strengthening multi-stakeholder processes and enhancing social and ecological connectivity.

## **Publications During Candidature**

Conference abstracts:

Eger, S., Doberstein, B. (2015) Connectivity and Inclusive Governance Structures as the Foundation to Healthy Social-Ecological Systems: Perspectives on Coastal and Marine Management in Dominican Republic. CASIOPA Healthy Parks, Healthy People Conference (Oral Presenter)

Eger, S., Doberstein, B. (2015) Perspectives of Coastal and Marine Stakeholders in the Dominican Republic. Canadian Water Network Conference (Poster Presenter)

Eger, S., Doberstein, B. (2014) Perspectives of Coastal and Marine Stakeholders in the Dominican Republic. Gulf and Caribbean Fisheries Institute (GCFI) 68th Conference (Poster Presenter)

Eger, S., Doberstein, B. (2014) Assessing the Inclusion of Marine Conservation Initiatives within the Caribbean Biological Corridor. National Conference and Global Forum on Science, Policy and the Environment (NCSE) (Poster Presenter)

## References

- ACP-Fish II Project. 2012. Maria del Carmen Arenas and Ian Scott, The Dominican Republic: a national strategy for the fisheries sector (English), Ref. N°: CAR-1.2-B2a: Retrieved from: [http://acpfish2eu.org/uploads/projects/id139/Annex%201%20FTR\\_English.pdf](http://acpfish2eu.org/uploads/projects/id139/Annex%201%20FTR_English.pdf)
- Almany, G.R., Connolly, S.R., Heath, D.D., Hogan, J.D., Jones, G.P., McCook, L.J., Mills, M., Pressey, R.L., Williamson, D.H., 2009. Connectivity, biodiversity conservation and the design of marine reserve networks for coral reefs. *Coral Reefs* 28, 339– 351.
- Andrade, G.S. & J.R. Rhodes. 2012. Protected Areas and Local Communities: an Inevitable Partnership toward Successful Conservation Strategies? *Ecology and Society*, 17 (4), 14.
- Angulo-Valdes, J.A. and B.G. Hatcher. 2010. A new typology of benefits derived from marine protected areas. *Marine Policy* 39:234-240.
- Arceo, H.O., et al. 2013. Moving Beyond a Top-Down Fisheries Management Approach in the Northwestern Mediterranean: Some Lessons from the Philippines. *Marine Policy* 39: 29-42. Print.
- Aswani, S., Christie, P., Nyawira, M.A., Mahon, R., Primavera, J.H., Cramer, L. A., Barbier, E.B,m Granek, E.F., Kennedy, C.J., Wolanski, E. and S. Hacker. 2012. The way forward with ecosystem-based management in tropical contexts: Reconciling with existing management systems. *Marine Policy*, 36: 1-10
- Bazeley, P. 2007. Qualitative data analysis with NVIVO. Thousand Oaks, CA: Sage.
- Beddington JR, Agnew DJ, Clark CW. 2013. Current Problems in the Management of Marine Fisheries. *Marine Policy* 39:29-42.
- Berger, M., Grantham, H.S., Pressey, R.L., Wilson, K.A., Peterson, E.L., Dorfman, D., Mumby, P.J., Lourival, R., Brumbaugh, D.R., Possingham, H.P. 2010. Conservation planning for connectivity across marine, freshwater, and terrestrial realms. *Biological Conservation*, 143(3): 565-575
- Berkes, F., and C. Folke. 1998. *Linking Social and Ecological Systems: Management Practices and Social Mechanisms for Building Resilience*. Cambridge University Press, New York.
- Biermann, F. et al. 2012. Navigating the Anthropocene: Improving Earth System Governance. *Science*, (335): 1306-1307

- Biernacki, P. and D. Waldorf. 1981. Snowball Sampling. Problem and Techniques of Chain Referral Sampling. *SOCIOLOGICAL METHODS & RESEARCH*, 10(2): 141-163
- Birdlife International. 2010. Ecosystem Profile: The Caribbean Islands Biodiversity Hotspot. Critical Ecosystem Partnership Fund.
- Brondizio, E.S., Ostrom, E., and O.R. Young. 2009. Connectivity and the governance of multi-level social-ecological systems: the role of social capital. *Annual Review of Environment and Resources*, 34: 253-278
- Brugnach, M. and H. Ingram. 2012. Ambiguity: The challenges of knowing and deciding together. *Environmental Science and Policy*, 15: 60-71.
- Bustamante, G., Canals, P., Di Carlo, G. D., Gomei, M., Romani, M., Souan, H., and A. Vanzella-Khoury. 2014. Marine protected areas management in the Caribbean and mediterranean seas: making them more than paper parks. *Aquatic Conserv: Mar. Freshw. Ecosyst.* 24 (Suppl. 2): 153-165
- Camargo, C., Maldonado, J.H., Alvarado, E., Moreno-Sanchez, R., Mendoza, S., Manrique, N., Mogollon, A., Osorio, J.D., Grajales, A., Sanchez, J.A. 2009. Community involvement in management fo maintaining coral reef resilience and biodiversity in southern Caribbean marine protected areas. *Biodiversity Conservation*, 18:935-956
- CAR-SPAW-RAC. 2011a. Caribbean Biological Corridor. Retrieved from <http://www.car-spaw-rac.org/?Caribbean-Biological-Corridor,212>
- CAR-SPAW-RAC. 2011b. Marine protected areas: Caribbean Challenge Initiative. Retrieved from: <http://www.car-spaw-rac.org/?Marine-protected-areas,216>
- Castaño-Isaza, J., Newball, R., Roach, B., & W.Y. Lau 2015. Valuing beaches to develop payment for ecosystem services schemes in Colombia's Seaflower marine protected area. *Ecosystem Services*, 11(0), 22-31.
- Canizo, L.A.B., Davila., N.V., Joseph, V., Toussaint, R., Vilmond, J.H., Marcelin., H., Santana, A.D., Arias, Y., Almonte, J.R., Guzman, I., and G. Agramonte. 2009. Plan de accion del corredor biologico en el Caribe. ROLAC-UNEP
- Census of Marine Life International Secretariat Consortium for Ocean Leadership (COML). 2010. FIRST CENSUS OF MARINE LIFE 2010: HIGHLIGHTS OF A DECADE OF DISCOVERY. Retrieved

from: [www.coml.org](http://www.coml.org)

- Chakalall, B., Mahon, R., McConney, Nurse, L., and D. Oderson. 2007. Governance of fisheries and other living resources in the Wider Caribbean. *Fisheries Research*, 87: 92-99
- Christie, P., Pollnac, R.B., Fluharty, D.L., Hixon, M.A., Lowry, G.K., Mahon, R., Pietri, D., Tissot, B.N., White, A.T., Armada, N., and R. Eisma-Osorio. 2009. Tropical marine EBM: a synthesis of case studies and comparative analysis. *Coastal Management*; 37: 374–85.
- Chuenpagdee, R., Pascual-Fernandez, J.J., Szelienszky, E., Alegret, J.L., Fraga, J. and S. Jentoft. 2013. Marine protected areas: Re-thinking their inception. *Marine Policy* 39: 234-240.
- Cicin-Sain and Belifore, 2005. Linking marine protected areas to integrated coastal and ocean management: a review of theory and practice. *Ocean and coastal management*, 48: 847-868
- Creswell, J. 2007. *Qualitative inquiry and research design: Choosing among five approaches*. Sage Publications, Inc.
- Crooks and Sanjayan, 2006. *Connectivity conservation*. Cambridge University Press, Cambridge
- CTO (Caribbean Tourism Organization). 2009. *Individual country statistics—2007*. Available online at: <http://www.onecaribbean.org/content/files/2007DRtoHaitCountryStats.pdf>. (Accessed September 28, 2009.)
- Day J., Dudley N., Hockings M., Holmes G., Laffoley D., Stolton S. & S. Wells, 2012. *Guidelines for applying the IUCN Protected Area Management Categories to Marine Protected Areas*. Gland, Switzerland:
- Dominican Republic Tourism Ministry. N.D. Accessed May 24, 2015. <http://www.godominicanrepublic.com>
- Dominican Republic Encyclopedic Dictionary of the Environment (DREDE). 2015. Conservation and Poverty. Retrieved from: [http://www.diccionariomedioambiente.org/DiccionarioMedioAmbiente\\_en/en/cpo\\_new\\_conservaci%C3%B3n\\_y\\_pobreza.asp](http://www.diccionariomedioambiente.org/DiccionarioMedioAmbiente_en/en/cpo_new_conservaci%C3%B3n_y_pobreza.asp)
- Dukes, E. F., Firehock, K., & J. Birkhoff. (2011). *Community-based collaboration : bridging socio-ecological research and practice*. Charlottesville: University of Virginia Press.

Edgar, G.J. et al. 2014. Global conservation outcomes depend on marine protected areas with five key features. *Nature* 506, 216–220

Mahon, R. and P. McConney. 2013. Applying the Large Marine Ecosystem (LME) Governance Framework in the Wider Caribbean Region. *Marine Policy* 42.0 (2013): 99-110. Print.

Fanning, L., Mahon, R, and P. McConney. 2009a. Focusing on Living Marine Resource Governance: The Caribbean Large Marine Ecosystem and Adjacent Areas Project. *Coastal Management*, 37: 219-234

Fanning L., R. Mahon and P. McConney. 2009. Marine Ecosystem-Based Management in the Caribbean: an essential component of Principled Ocean Governance. Report of Caribbean Regional Symposium, University of the West Indies, Cave Hill Campus, Barbados, December 10-12, 2008. CERMES Technical Report No. 17, 44 pp

FAOSTAT. N.D. Dominican Republic. Retrieved from: <http://faostat.fao.org/> accessed 27/5/2009

Folke, C., Hahn, T., Olsson, P., Norberg, J. 2005. Adaptive governance of social-ecological systems. *Annu. Rev. Environment. Resour.* 30: 441-73. doi: 10.1146/annurev.energy.30.050504.144511

Foley, M.M., Halpern, F. Micheli, M.H., Armsby, M.R., Caldwell, C.M. Crain, E. Prahl, N. Rohr, D. Sivas, M.W. Beck, M.H. Carr, L.B. Crowder, J.E. Duffy, S.D. Hacker, K.L. McLeod, S.R. Palumbi, C.H. Peterson, H.M. Regan, M.H. Ruckelshaus, P.A. Sandifer, and R.S. Steneck. 2010. Guiding ecological principles for marine spatial planning. *Mar. Policy*, 34, pp. 955–966

Gardner, L. 2015. Understanding connectivity conservation in the context of social-ecological systems: Perspectives from the Caribbean. *Parks Caribbean*, Retrieved from: <http://parks-caribbean.net/understanding-connectivity-conservation-in-the-context-of-social-ecological-systems-perspectives-from-the-caribbean/?shared=email&msg=fail>

Global Environment Facility (GEF). 2011. “From Ridge to Reef: Water, Environment, and Community”.

GLIPSA, 2014. Island Bright Spots: Invest in What Works. Retrieved from: <http://glispa.org/bright-spots>

Griffith, M., Correa, M.A.M., and J. Thilbert. 2012. Establishment of the Caribbean Biological Corridor (CBC) as a Framework for Biodiversity Conservation, Environmental Rehabilitation

and Development of Livelihood Options in Haiti, the Dominican Republic and Cuba. UNEP *South to South CBC Case Study*. <http://www.unep.org/south-south-cooperation/case/casedetails.aspx?csno=71>

Grober-Dunsmore, R., Pittman, S.J., Caldow, C., Kendall, M.S., and T.K. Frazer. 2009. A Landscape Ecology Approach for the Study of Ecological Connectivity Across Tropical Marine Seascapes, pp 493-530

*Grupo Jaragua. [Internet]. 2006 [cited 2013 Nov 20]. Conectividad biológica en la Reserva de la Biosfera JBE.*

Herrera, A., Betancourt, L., Silva, M., Lamelas, P. and A. Melo. 2011. Coastal fisheries of the Dominican Republic. In S. Salas, R. Chuenpagdee, A. Charles and J.C. Seijo (eds). Coastal fisheries of Latin America and the Caribbean.

Heredia, F.L., and E.I. Martinez. 2013. Las Costeros Dominicanas: Políticas y recomendaciones para la gestión integrada. Academia de Ciencias de la República Dominicana. Santo Domingo, DR.

Hess, G.R. and R.A. Fischer. 2001. Communicating clearly about conservation corridors. *Landscape and Urban Planning* 55: 195-208.

Holmes, G. 2010. The Rich, the Powerful and the Endangered: Conservation Elites, Networks and the Dominican

Honey, M., and D. Krantz. 2007. Global Trends in Coastal Tourism. Center on Ecotourism and Sustainable Development prepared for Marine Program WWF. Washington, D.C.

IUCN. 2007. Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors. IUCN Regional Protected Areas Programme, Asia.

Jones, P.J.S., Qiu, W. & E. M. De Santo. 2013. Governing marine protected areas: social-ecological resilience through institutional diversity. *Marine Policy*, 41, 5-13  
doi:10.1016/j.marpol.2012.12.026

Juffe-Bignoli, D., Burgess, N.D., Bingham, H., Belle, E.M.S., de Lima, M.G., Deguignet, M., Bertzky, B., Milam, A.N., Martinez-Lopez, J., Lewis, E., Eassom, A., Wicander, S., Geldmann, J., van Soesbergen, A., Arnell, A.P., O'Connor, B., Park, S., Shi, Y.N., Danks, F.S., MacSharry, B., and N. Kingston. 2014. Protected Planet Report 2014. UNEP-WCMC: Cambridge, UK.

Kearney, J., Berkes, F., Charles, A., Pinkerton, E., and M. Wiber. 2007. The Role of Participatory

Governance and Community-Based Management in Integrated Coastal and Ocean Management in Canada. *Coastal Management*. 35 (1): 79-104.

- Kelleher, G. 1999. Guidelines for Marine Protected Areas. IUCN, Gland, Switzerland and Cambridge, UK. xxiv +107pp.
- Kenchington, R. and G. Kelleher. 1995. Making a management plan. Pages 85-102 in Gubbay, S. (ed.) *Marine Protected Areas: principles and techniques for management*. London: Chapman and Hall.
- Khera, N. 2014. Sustainable Management of Marine and Coastal Protected Areas: Taking an Inclusive Approach Sustainable Management Of Marine and Coastal Protected Areas: Taking An Inclusive Approach. 17: 264-273. Retrieved from: [http://www.academia.edu/8340249/Sustainable\\_Management\\_of\\_Marine\\_and\\_Coastal\\_Protected\\_Areas\\_Taking\\_an\\_Inclusive\\_Approach\\_Sustainable\\_Management\\_Of\\_Marine\\_and\\_Coastal\\_Protected\\_Areas\\_Taking\\_An\\_Inclusive\\_Approach](http://www.academia.edu/8340249/Sustainable_Management_of_Marine_and_Coastal_Protected_Areas_Taking_an_Inclusive_Approach_Sustainable_Management_Of_Marine_and_Coastal_Protected_Areas_Taking_An_Inclusive_Approach)
- Knowles, J. E., Doyle, E., Schill, S. R., Roth, L. M., Milam, A., & G.T. Raber. 2015. Establishing a marine conservation baseline for the insular Caribbean. *Marine Policy*, 60, 84-97. doi:<http://dx.doi.org/10.1016/j.marpol.2015.05.005>
- Kooiman, J., and M. Bavinck. 2005. The governance perspective. Pages 11-25 in J. Kooiman, M. Bavinck, S. Jentoft, and R. Pullin, editors. *Fish for life: interactive governance for fisheries*. Amsterdam University Press, Amsterdam, the Netherlands.
- Leadley, P.W., Krug, C.B., Alkemade, R., Pereira, H.M., Sumaila U.R., Walpole, M., Marques, A., Newbold, T., Teh, L.S.L, van Kolck, J., Bellard, C., Januchowski-Hartley, S.R. and P.J. Mumby. 2014. Progress towards the Aichi Biodiversity Targets: An Assessment of Biodiversity Trends, Policy Scenarios and Key Actions. Secretariat of the Convention on Biological Diversity, Montreal, Canada. Technical Series 78, 500 pages
- Le Corre, N., Guichard, F., and L. Johnson. 2012. Connectivity as a Management Tool for Coastal Ecosystems in Changing Oceans. *Oceanography*, Prof. Marco Marcelli (Ed.), ISBN: 978-953-51-0301-1, InTech, DOI: 10.5772/27704. Available from: <http://www.intechopen.com/books/oceanography/connectivity-as-a-tool-to-manage-coastal-ecosystems-in-changing-oceans>
- Leon, Y.M. 2004. Community impacts of coastal tourism in the Dominican Republic. *Dissertations and Master's Theses (Campus Access)*. Paper AAI3147809. <http://digitalcommons.uri.edu/dissertations/AAI3147809>

- Long, R.D., Charles, A., and R.L. Stephenson. 2015. Key principles of marine ecosystem-based management. *Marine Policy*, 57:53-60
- Lopes, P. F. M., et al. 2013. Suggestions for Fixing Top-Down Coastal Fisheries Management through Participatory Approaches. *Marine Policy* 40.0: 100-10. Print.
- López-Angarita, J., Moreno-Sánchez, R., Maldonado, J. H. and J.A. Sánchez. (2014), Evaluating Linked Social–Ecological Systems in Marine Protected Areas. *Conservation Letters*, 7: 241–252. doi: 10.1111/conl.12063
- Man and Biosphere (MaB). 2014. Workshop. Location, regarding JBE- La Selle joint biosphere.
- Mahon, R., Fanning, L., and P. McConney. 2009. A governance perspective on the large marine ecosystem approach. *Marine Policy*, 33: 317-321
- Mahon, R., A. Cooke, L. Fanning and P. McConney. 2013. Governance arrangements for marine ecosystems of the Wider Caribbean Region. Centre for Resource Management and Environmental Studies, University of the West Indies, Cave Hill Campus, Barbados. CERMES Technical Report No 60.99p.
- Marshall, M.G. 2013. Polity IV Country Report 2010 in Individual Country Regime Trends, 1946-2013, Polity IV Project: Political Regime Characteristics and Transitions, 1800-2013. *Center for Systemic Peace*. Retrieved from: <http://www.systemicpeace.org/p4creports.html>
- Mateo, J. and M.O. Haughton. 2004. A review of fisheries management in the Dominican Republic; Una revision del manejo pesquero en la Republica Dominicana. In: Proceedings of the Gulf and Caribbean Fisheries Institute, 55, pp. 90-102.
- Ministerio de Medio Ambiente y Recursos Naturales (MMARN). 2014. <http://faostat.fao.org/> accessed 27/5/2009)
- Millenium Ecosystem Assessment. 2005. Coastal Systems In: Current State and Trends Assessment. Island Press 513-549
- Miller, M.L. and Auyong, J., 1991. Coastal Zone Tourism. *Marine Policy*, 15(2): 75-99
- Marey-Pérez, M.F., Calvo-Gonzalez, A., and G. Domingo-Torres. 2014. Are the communal forest owners involved in the management of their lands? A qualitative analysis for the case of Galicia (Spain). *Bosque* 35 (2): 207-215 DOI: 10.4067/S0717-92002014000200008

- Muro, M. & P. Jeffrey. 2008. A critical review of the theory and application of social learning in participatory natural resource management processes, *Journal of Environmental Planning and Management*, 51:3, 325-344
- Neuman and Robson. 2009. Basics of Social Research: Qualitative and Quantitative Approaches. Pearson Canada Inc., Toronto, Ontario, Canadian Edition
- Oakerson, R.J. 1992. Analyzing the commons: a framework. Pages 41–59 in D. Bromley, editor. *Making the commons work: theory, practice and policy*. ICS Press, San Francisco.
- Olds, A.D., Connolly, R.M., Pitt, K.A., and P.S. Maxwell. 2012. Habitat connectivity improves reserve performance. *Conservation Letters*, 5: 56-63
- Ostrom E. 2010. Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change* 20(4): 550–557
- Peters, V., & F. Wester. 2007. How qualitative data analysis software may support the qualitative analysis process. *Quality & Quantity*, 41, 635-659.
- Phillips, A. 2003. Turning ideas on their head: a new paradigm for protected areas. *George Wright Society Forum*, 20, 8–32.
- Pittman, S.J., Monaco, M.E., Friedlander, A.M., Legare, B., Nemeth, R.S., et al. 2014. Fish with Chips: Tracking Reef Fish Movements to Evaluate Size and Connectivity of Caribbean Marine Protected Areas. *PLoS ONE* 9(5): e96028. doi:10.1371/journal.pone.0096028.
- Pollnac, R, et al. 2010. Marine Reserves as Linked Social-Ecological Systems. *Proceedings of the National Academy of Sciences of the United States of America* 107 (43): 18262-5. Print.
- Population Reference Bureau. 2014. 2014 World Population Data Sheet. Retrieved from [www.prb.org](http://www.prb.org)
- Protected Planet. 2014. Dominican Republic. Retrieved from: <http://www.protectedplanet.net/search?country=316&marine=true&q=Dominican+Republic&region=4>
- Richards, L. 2015. Handling Qualitative Data: A Practical Guide. 3rd ed.. SAGE
- Rodríguez-Rodríguez, D., Rees, S. E., Rodwell, L. D., & M.J. Attrill. 2015. IMPASEA: A methodological framework to monitor and assess the socioeconomic effects of marine protected areas. An English Channel case study. *Environmental Science & Policy*, 54, 44-51.

doi:<http://dx.doi.org/10.1016/j.envsci.2015.05.019>

- Magris, R., Pressey, R., Weeks, R., and N.C. Ban. 2014 Integrating connectivity and climate change into marine conservation planning, *Biological Conservation*, 170: 207-221, <http://dx.doi.org/10.1016/j.biocon.2013.12.032>.
- Reed, M. S., A. C. Evely, G. Cundill, I. Fazey, J. Glass, A. Laing, J. Newig, B. Parrish, C. Prell, C. Raymond, and L. C. Stringer. 2010. What is social learning? *Ecology and Society*, 15(4): r1. [online] URL: <http://www.ecologyandsociety.org/vol15/iss4/resp1/>
- Reynoso, O. 2011. Convention of Biological Diversity. Retrieved from: <https://www.cbd.int/doc/meetings/mar/rwebsa-wcar-01/other/rwebsa-wcar-01-dominica-02-en.pdf>
- Roberts, C., Halpern, B., Palumbi, S.R., and R. Warner. 2001. Designing Marine Reserve Networks: Why Small Isolated Protected Areas are Not Enough, 2 (3)
- Roff, J., Zacharias, M. 2011. Marine Conservation Ecology. Earthscan.
- Ruiz, V. 2012. Job Satisfaction among fishers in the Dominican Republic. *Soc. Indic. Res.* 109:81-94 DOI 10.1007/s11205-012-0057-1
- Rupp, E., Incháustegui, S., and Y. Arias. 2005. Conservation of *Cyclura ricordii* in the southwestern Dominican Republic and a brief history of Grupo Jaragua. *Iguana* 12:223-233.
- Rupp, E. [Internet]. 2013 [cited 2013 Nov 21]. Tropical Forest Forever Fund Supports Expansion of Jaragua-Bahoruco-Enriquillo Biosphere Reserve, Dominican Republic. Available from <http://www.gcbo.org/html/Jaragua-Bahoruco-EnriquilloBiosphereReserve.pdf>
- Ruta, G. 2003. *Coastal zones management and tourism in the Dominican Republic*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/2003/12/15893856/coastal-zones-management-tourism-dominican-republic>
- Saldana, J. 2015. Thinking qualitatively: methods of mind. Thousand Oaks, California. SAGE.
- Salas, S., Chuenpagdee, R., Seijo, J. C., and A. Charles. 2011. Challenges in the assessment and management of small-scale fisheries in Latin America and the Caribbean. *Fisheries Research*, 87: 5-16

- Santana, A.D., Feliz, J.M.M., and J.E. Baez. 2012. Plan de Accion para la implementacion del programa de trabajo sobre areas protegidas de la convención sobre la diversidad biológica: Republica Dominicana. Secretariat of the Convention on Biological Diversity.
- Schelhas, J., Sherman, R.E., Fahey, T.J., and J.P. Lassoie. 2002. Linking community and national park development: A case from the Dominican Republic. *Natural Resources Forum*, 26:140-149.
- Schill, S., Raber, G., Roberts, J., and E. Trembl. 2012. A vision for protecting marine resources across the Caribbean biological corridor. The Nature Conservancy.
- Secretariat of the Convention on Biological Diversity (SCBD). 2004. Technical advice on the establishment of a national system of marine and coastal protected areas. CBD technical series, no. 13. SCBD, Montreal.
- Silva, M. 2003. "Real fish catches in the Dominican Republic." *Atajo 2*: 22–23. [In Spanish] UNEP/GPA (Global Program of Action). 2003. "Diagnosis of the Erosion Processes in the Caribbean Sandy Beaches." Available online at: [http://www.gpa.unep.org/documents/diagnosis\\_of\\_the\\_erosion\\_english.pdf](http://www.gpa.unep.org/documents/diagnosis_of_the_erosion_english.pdf). (Accessed September 18, 2009.)
- Slocumbe DS. 1998. Defining goals and criteria for ecosystem-based management. *Environmental Management*, 22: 483–93.
- Slocumbe, S. 2010. Chapter 15: Applying an Ecosystem Approach. *Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty. Fourth Edition*. Don Mills, Ontario: Oxford University Press.
- Sobel, J.1996. Marine reserves: necessary tools for biodiversity conservation? *Global Biodiversity*, 6(1): 8–18.
- Southwestern Dominican Republic and a Brief History of the Grupo Jaragua. *Conservation of Cyclura ricordii*, 12:4
- South to South Cooperation. 2011. Case Study: Establishment of the Caribbean Biological Corridor (CBC) as a Framework for Biodiversity Conservation, Environmental Rehabilitation and Development of Livelihood Options in Haiti, the Dominican Republic and Cuba. Retrieved from <http://www.unep.org/chinese/south-south-cooperation/case/casefiles.aspx?csno=71>
- Spalding, M.D. et al. 2007. Marine Ecoregions of the World: A Bioregionalization of Coastal and

- Shelf Areas. *BioScience*, 57(7): 573-583.
- Spradley, J.P. 1979. *The ethnographic interview*. Fort Worth, TX: Holt, Reinhart, and Winston.
- Steneck, R., Paris, C., Arnold, S., Ablan-Lagman, M., Alcala, A., Butler, M., McCook, L., Russ, G., Sale, P. 2009. Thinking and managing outside the box: coalescing connectivity networks to build region-wide resilience in coral reef ecosystems. *Coral Reefs*, 28:367-378.
- Strauss, A., & Corbin, J. 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications, Inc.
- Stipanuk, D. 2003. *The Punta Cana Resort and Club: a sustainability model in the Caribbean*. Report for the World Travel & Tourism Council, London, UK and The Conference Board, New York, New York, USA.
- Taylor, P.D., Fahrig, L. Henein, K. and Merriam, G. 1993. Connectivity is a vital element of landscape structure. *Oikos* 68(3): 571-572.
- The Conservation Planning Group. Accessed 2015. Conservation planning for connectivity. Retrieved from: <http://conservationplanning.org/research/conservation-planning-for-connectivity/>
- The international Ecotourism Society. 2009. What is ecotourism? Accessed, <https://www.ecotourism.org/what-is-ecotourism>
- Thrush, S.F., Ellingsen, K.E., and K. Davis. 2015. Implications of fisheries impacts to seabed biodiversity and ecosystem-based management. *ICES J. Mar. Sci.* doi: 10.1093/icesjms/fsv114
- Torres, R., and V. Ulloa. N.D. *Community Sustainable Management: La Caleta National Marine Park*
- UNEP. 2011. *Taking Steps toward Marine and Coastal Ecosystem-Based Management: An Introductory Guide*
- UNESCO. 1997. *Healthy Ocean, Healthy People: Knowing our ocean, protecting our marine treasures, empowering ocean citizens*.
- UNESCO. 2013. *What is a biosphere reserve? United Nations Educational, Scientific and Cultural*

Organization. Retrieved from: <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/mai>

UN SIDS. 2014. Caribbean Challenge Initiative (CCI). Retrieved from: <http://www.sids2014.org/index.php?page=view&type=1006&nr=2320&menu=1507>  
*UNDP/GEF CLME Project, 2011*

Waite et al., 2014. Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean. WRI <http://www.wri.org/publication/coastal-capital-guidebook>

USAID. 2005. A pilot Case Study: Environmental Security in the Dominican Republic: Promise or Peril? Foundation for environmental security and sustainability

UNDP/GEF CLME Project. 2011. Sustainable Management of the Shared Living Marine Resources of the Caribbean Sea Large Marine Ecosystem (CLME) and Adjacent Regions: Caribbean Large Marine Ecosystem Regional Transboundary Diagnostic Analysis. Retrieved from: <http://www.clmeproject.org/documentscenter.html>

UNEP-IUCN. 2006. *World Database on Protected Areas*. Cambridge: United Nations Environment Programme–International Union for Conservation of Nature.

UNEP. 2013. Haiti - Dominican Republic: Environmental challenges in the border zone. <http://unep.org/Haiti/>

UNEP. 2008. Vital Water Graphics - An Overview of the State of the World's Fresh and Marine Waters. 2nd Edition. UNEP, Nairobi, Kenya. ISBN: 92-807-2236-0

UNEP. 2012. Ecological Connectivity Through Institutional Connectivity. UNEP Global Conference on Land Ocean Interactions, Manila, The Philippines, in a break-out session on Ecosystem-based Coastal Planning and Management

Uzzo, S. M. 2013. Puntacana Ecological Foundation and the scaling of sustainable tourism development. *Ecology and Society* 18(4): 73. <http://dx.doi.org/10.5751/ES-06259-180473>

Van der Meer, L., Ramdeen, R., Zylich, K. and Zeller, D. (2014) Reconstruction of total marine fisheries catches for the Dominican Republic (1950-2009). pp. 43-54. In: Zylich, K., Zeller, D., Ang, M. and Pauly, D. (eds.) Fisheries catch reconstructions: Islands, Part IV. Fisheries Centre Research Reports 22(2). Fisheries Centre, University of British Columbia [ISSN 1198-6727]

Waite et al., 2014. Coastal Capital: Ecosystem Valuation for Decision Making in the Caribbean.

WRI. <http://www.wri.org/publication/coastal-capital-guidebook>

Weigel, J.Y., Mannle, K.O., Bennett, N.J., Carter, E., Westlund, L., Burgener, V., Hoffman, Z., Simao da Silva, A., Abou Kane, E., Sanders, J., Piante, C., Wagiman, S., Hellman, A. 2014. Marine protected areas and fisheries: bridging the divide. *Aquatic Conservation: Marine and Freshwater Ecosystems* 24 (Suppl. 2), 199 - 215

Wielgus, Jeffrey, Emily Cooper, Ruben Torres, and Laretta Burke. 2010. Coastal Capital: Dominican Republic. Case Studies on the Economic Value of Coastal Ecosystems in the Dominican Republic. Washington, D.C.: World Resources Institute. Accessible at: [http://pdf.wri.org/working\\_papers/coastal\\_capital\\_dominican\\_republic.pdf](http://pdf.wri.org/working_papers/coastal_capital_dominican_republic.pdf)

Williams, J. A. 2008. Building community through socially responsible tourism: a collaborative success in the Dominican Republic. *Sustainable Tourism* 11, 111-119. doi:10.2495/ST080121

Wondolleck, J.M., and Yaffee, S.L. 2000. Making Collaboration Work: Lessons from Innovation in Natural Resources Management. Washington, DC: Island Press, 2000. Pp. 277

Wood, A. L., Butler, J. R. A., Sheaves, M., & Wani, J. 2013. Sport fisheries: Opportunities and challenges for diversifying coastal livelihoods in the Pacific. *Marine Policy*, 42, 305-314. doi:10.1016/j.marpol.2013.03.005

Wood, L.J., L Fish, J Laughren, D. Pauly. 2008. Assessing progress towards global marine protection targets: shortfalls in information and action, *Oryx*, 42 (2008), pp. 340–351

World Bank. 2010. Dominican Republic. Retrieved from: <http://www.worldbank.org/en/news/feature/2013/04/26/Agricultura-Republica-Dominicana-desastres-naturales>

World Bank. 2015. Dominican Republic Overview. Retrieved from: <http://www.worldbank.org/en/country/dominicanrepublic/overview>

Worboys, G., Francis, W. and Lockwood, M. (Eds). 2010. *Connectivity Conservation Management: A global guide*. Earthscan, London.

Worboys, G.M. Lockwood, A. Kothari, S. Feary and I. Pulsford (eds) (2015) *Protected Area Governance and Management*, ANU Press, Canberra.

WTTC (World Travel and Tourism Council). 2009b. Key Facts at a Glance- Dominican Republic.

Retrieved from:

[http://www.wttc.org/eng/Tourism\\_Research/Tourism\\_Economic\\_Research/Country\\_Reports/Dominican\\_Republic](http://www.wttc.org/eng/Tourism_Research/Tourism_Economic_Research/Country_Reports/Dominican_Republic). Mateo and Haughton, 2004

Wyborn, C. (2011). Landscape scale ecological connectivity: Australian survey and rehearsals. *Pacific Conservation Biology*, 17: 121-131

Zeller, D., Pauly, D. 2015. Exclusive Economic Zones (EEZ). Sea Around Us. Retrieved from: <http://www.searoundus.org/doc/Methods/Area/Methods-EEZ-LMEs-shelf-etc-New-June-11-2015.pdf>

## Appendix A

Table A1: A new paradigm for protected areas (Phillips, 2003)

<b>Topic</b>	<b><i>As it was: protected areas were ...</i></b>	<b><i>As it is becoming: protected areas are ...</i></b>
<b>Objectives</b>	<ul style="list-style-type: none"> <li>• Set aside for conservation</li> <li>• Established mainly for spectacular wildlife and scenic protection</li> </ul>	<ul style="list-style-type: none"> <li>• Run also with social and economic objectives</li> <li>• Often set up for scientific, economic and cultural reasons</li> </ul>
	<ul style="list-style-type: none"> <li>• Managed mainly for visitors and tourists</li> <li>• Valued as wilderness</li> <li>• About protection</li> </ul>	<ul style="list-style-type: none"> <li>• Managed with local people more in mind</li> <li>• Valued for the cultural importance of so-called “wilderness”</li> <li>• Also about restoration and rehabilitation</li> </ul>
<b>Governance</b>	Run by central government	Run by many partners
<b>Local people</b>	<ul style="list-style-type: none"> <li>• Planned and managed against people</li> <li>• Managed without regard to local opinions</li> </ul>	<ul style="list-style-type: none"> <li>• Run with, for, and in some cases by local people</li> <li>• Managed to meet the needs of local people</li> </ul>
<b>Wider context</b>	<ul style="list-style-type: none"> <li>• Developed separately</li> <li>• Managed as ‘islands’</li> </ul>	<ul style="list-style-type: none"> <li>• Planned as part of national, regional and international systems</li> <li>• Developed as ‘networks’ (strictly protected areas, buffered and linked by green corridors)</li> </ul>
<b>Perceptions</b>	<ul style="list-style-type: none"> <li>• Viewed primarily as a national asset</li> <li>• Viewed only as a national concern</li> </ul>	<ul style="list-style-type: none"> <li>• Viewed also as a community asset</li> <li>• Viewed also as an international concern</li> </ul>
<b>Management techniques</b>	<ul style="list-style-type: none"> <li>• Managed reactively within short timescale</li> <li>• Managed in a technocratic way</li> </ul>	<ul style="list-style-type: none"> <li>• Managed adaptively in long term perspective</li> <li>• Managed with political considerations</li> </ul>
<b>Finance</b>	Paid for by taxpayer	Paid for from many sources
<b>Management skills</b>	Managed by scientists and natural resource experts	Managed by multi-skilled individuals

## A2: Dominican Republic System of Protected Areas

### **Mission of Office of Protected Areas, DR**

“To contribute to the conservation of biodiversity all over the country as a basis for sustainable development and the improvement of the quality of life through the administration of a national system of protected areas, as well as the implementation of rules and regulations in the Dominican Republic.” (DREDE, 2015, para. 11)

### **Office of Protected Areas:**

- I. Coordinates the design and implementation of the national development policy of protected areas and the country’s biodiversity conservation;
- II. Develops and implements rules, regulations and procedures which are necessary for the sustainable management of the protected areas and their biodiversity;
- III. Regulates the use and transfer of biodiversity resources;
- IV. Promotes the development, conservation and management of flora and fauna resources;
- V. Manages the national system of protected areas so as to ensure their integrity, the provision of environmental services and the healthy and environmentally friendly interaction with users; and
- VI. Promotes the participation of rural communities in plans, programs and projects for the conservation of biodiversity and the protected areas.

(DREDE, 2015)

### **The national objectives of the National System of Protected Areas (SINAP) of Dominican Republic, are the following:**

The conservation objectives of the National System of Protected Areas (Law 202-04) are:

- 1) Store in a natural state representative samples of ecosystems, communities biotic, biogeographic units and physiographic regions;
- 2) conserve biological diversity and genetic resources;
- 3) Protect watersheds and water resources;
- 4) Maintain ecological processes and increase environmental services;
- 5) to protect endemic wildlife and endangered species;
- 6) Protect landscape resources and geological or paleontological formations outstanding;
- 7) Protect the underground systems, including aquifers, ecosystems and Aboriginal cultural events;
- 8) Keep the archaeological sites, colonial monuments and relics architectural;
- 9) Provide opportunities for scientific research and environmental monitoring;

- 10) Promote the maintenance of specific cultural attributes and knowledge traditional local populations;
- 11) To contribute to the environmental education of the population;
- 12) Provide opportunities for recreation and tourism, and serve as a natural base national tourist industry based on the principles of sustainable development;
- 13) Provide the environmental services present and future generations;
- 14) To provide opportunities for ecologically and environmentally sound generating income as to ensure the maintenance of the National System of Areas Protected and to improve economic and social conditions of communities neighbors.

Table A3: IUCN Category descriptions

Category	Description
<b>Ia</b>	<b>Strict Nature Reserve:</b> Protected area managed mainly for science.
<b>Ib</b>	<b>Wilderness Area:</b> Protected area managed mainly for wilderness protection.
<b>II</b>	<b>National Park:</b> Protected area managed mainly for ecosystem protection and recreation.
<b>III</b>	<b>Natural Monument:</b> Protected area managed mainly for conservation of specific natural features.
<b>IV</b>	<b>Habitat/Species Management Area:</b> Protected area managed mainly for conservation through management intervention.
<b>V</b>	<b>Protected Landscape/Seascape:</b> Protected area managed mainly for landscape/seascape conservation and recreation.
<b>VI</b>	<b>Managed Resource Protected Area:</b> Protected area managed mainly for the sustainable use of natural ecosystems.

Table A4: Classification of Protected Areas in the Dominican Republic

<p><b>IUCN Categories</b></p> <p>Dominican Republic (26) Marine Protected Areas</p> <p><b>IUCN CATEGORY:</b></p> <p>(1) Ia (1) Ib (2) II (8) III (1) IV (10) V (4)</p> <p>ECOREGION: Marine (26)</p> <p>DESIGNATION</p> <ul style="list-style-type: none"> <li>-Marine Mammal Sanctuary (2)</li> <li>-National Park (6)</li> <li>-National Recreation Area (1)</li> </ul>
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## Appendix B: Additional Information for Large –Scale Initiatives

Table B1: Goals of Caribbean Biological Corridor (CBC)

CBC aims to:
1. To define the spatial boundaries of the CBC and compile existing information. 2. To facilitate the strengthening of a network of protected areas within the CBC.
3. To identify and implement livelihood alternatives for the communities and concomitantly reduce pressures on biological diversity.
4. To contribute to the development of the human resources needed in the participating countries, so as to ensure the sustainability of the conservation and sustainable development activities undertaken in the framework of the CBC.
5. To facilitate the creation of a tri-national coordination entity to support the creation and development of the Caribbean Biological Corridor.

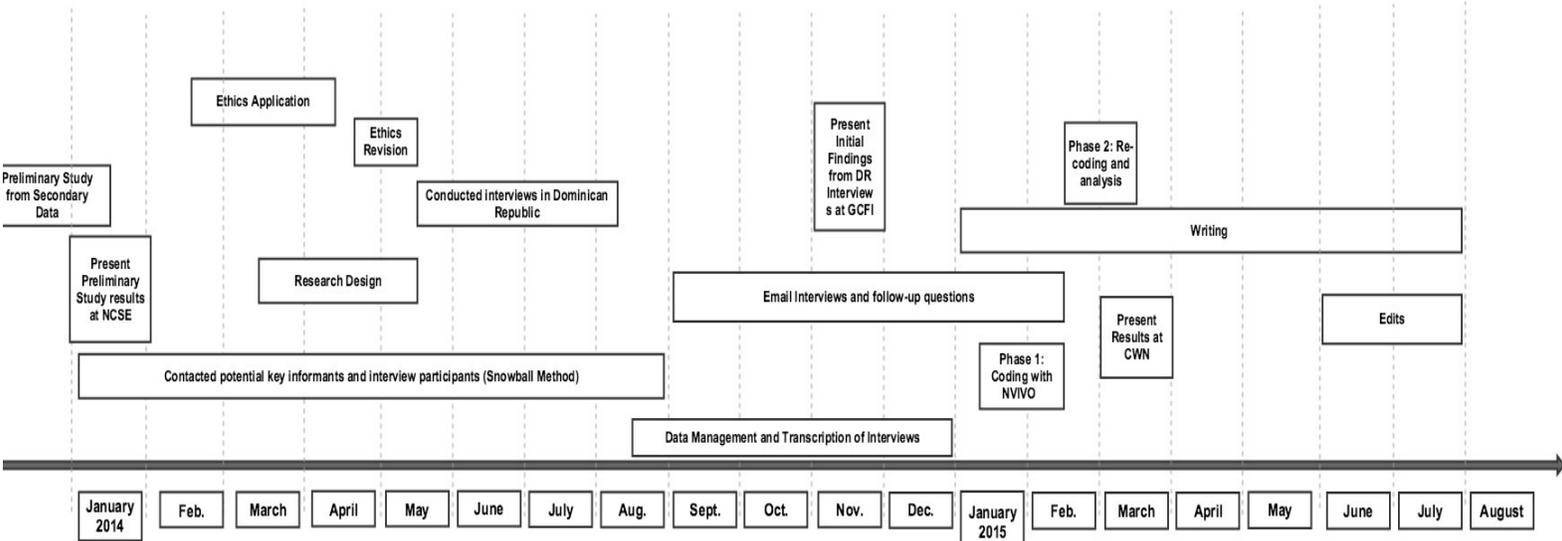
Table B2: The 2009 CBC Plan of Action listed 13 marine-related initiatives as project priorities for future action (Canizo et al., 2009).

Summary of Planned Future Actions in the Marine Realm	Location
<i>A) Ecosystem Assessments</i>	
1. I.8 Rapid Ecological Assessment of Main Coastal Ecosystems	Cuba, Haiti, Dominican Republic
2. I.14 Major Ecosystem monitoring of Coastal Areas (Marine Pastures, Mangrove and Coral Reefs)	Cuba, Haiti, Dominican Republic
3. I.15 Diagnosis of the current state of Beaches	Dominican Republic
4. III.11 Determine the degree of connectivity between the islands of Cuba and Hispaniola from mobility studies of large marine fish	Cuba, Hispaniola
<i>B) Management</i>	
1. II.5 Integrated Management and Mangrove community	Northeastern Haiti
2. IV.8 Capacity building for Integrated Coastal Zone Management (ICZM)	Unspecified
<i>C) Research and Development</i>	
1. II.2 Promotion of Mangrove Oyster ( <i>Crassostrea rhizophorae</i> ) Farming and integration of fishing communities	Haiti, Dominican Republic
2. II.6 Renewable-Based Energy for coastal communities	Northeastern Haiti
3. II.10 Access to Technology and Communication	Northeastern Haiti
<i>D) Species specific monitoring</i>	
1. I.10 Preliminary population density monitoring of three species of crabs ( <i>Ucides cordatus</i> , <i>Gecarcinus ruricola</i> , <i>Cardisoma guanhumi</i> )	Dominican Republic, Cuba
2. I.11 Sea Turtle Nesting	Southwest Cuba, Northwest Haiti, Southwest/ western Dominican Republic
3. I.12 Resource monitoring of Queen Conch ( <i>Strombus giga</i> )	Dominican Republic, Cuba
4. III.4 Lionfish ( <i>Pterois volitans</i> )	Northwest/Southwest Hispaniola, Eastern Cuba

Table B3: Specific Deliverables for the Caribbean Challenge Initiative (CCI) (UN SIDS, 2014).

<i>To develop and implement ecosystem based adaptation to climate change projects.</i>
<i>To advance needed legal and policy actions.</i>
<i>To create new sustainable finance mechanisms. (e.g. tourism-based fees and debt-for-resilience swaps)</i>
<i>To establish and capitalize national protected area trust funds.</i>
<i>To complete Protected Area Master Plans.</i>

### Appendix C : Timeline of Methodological Events



## Appendix D

Table D1: Emergent themes after initial coding

(Sources indicate the number of informants who commented on a certain topic, whereas References indicate the total frequency of comments on a given topic).

Name	Sources	References
● climate change	3	8
● community-level action	8	18
▼ ● Connectivity	0	0
▼ ● collaboration	6	9
● Vla social networks	3	6
● conservation and environment	10	18
● knowledge sharing	8	12
● Current and Future Projects	8	30
● decision making and capacity	9	15
● Governance Frameworks	5	9
▼ ● Large scale initiatives	1	3
● CBC	5	7
● CCI	2	6
● Other	3	5
▼ ● Limitations	0	0
● coordination between levels of government	7	7
● education and training	11	15
● financing	5	9
● interest or presence	10	19
● Lack of Authority and Enforcement	9	23
● local perceptions	1	3
● Misc	14	29
● paper parks	6	11
● ResourcesStaff	7	15
● Turnover of government	3	3
● Private sector	11	16
▼ ● Protected Areas	5	15
● model areas	3	4
● QUOTES to use	5	9
▼ ● Recommendations	17	34
● long term	2	2
▼ ● Social-Ecological systems	5	5
● livelihoods (alternatives)	12	24
▼ ● Tourism	12	29
● tourist education	2	2
● stakeholder incentives	6	8
● Successes	6	8
● Threats	10	24

Table D2: Emergent themes after second order coding. (Considerations for Management; Current and Future Projects; Governance Frameworks; Limitations; and Recommendations on how to achieve effective management.)

Name	Sources	References
▼ ● Connectivity (2)	0	0
● biological	9	14
▼ ● Large scale initiatives	4	7
▼ ● CBC	14	34
● limitations	1	7
● Successes	1	9
▼ ● CCI	7	26
● CBF	2	4
● Other	9	15
▼ ● social	6	8
● knowledge sharing platforms	15	22
● Via social networks	5	8
▼ ● Considerations for management	0	0
▼ ● Perspectives on PAs	0	0
● Howwhy	4	9
● mistakes	3	9
● model areas	9	12
▼ ● Social–Ecological systems	6	6
● culture	3	5
● livelihoods (alternatives)	19	42
▼ ● Tourism	15	33
● cons	9	17
● pros	6	7
● tourist education	3	4
● stakeholder incentives	10	13
▼ ● Current and Future Projects	0	0
▼ ● current projectspriorities	10	18
● Marina de guerra	1	5
▼ ● future	9	13
● climate change	3	8

▼ ● Successes	13	21
● legislation. top down effort	3	5
● market based incentive	1	1
● partnerships	6	9
● private sector initiatives	2	3
▼ ● Threats ( how different than limitations)	16	35
● ecosystem destruction, coastal development	4	4
● lack of government leadership	3	3
● mass tourism	4	6
● overfishing, non targetted, illegal	6	9
▼ ● pollution	5	6
● from industry	3	4
● Governance Frameworks	0	0
● co-management, community involvement	10	12
● decision making and capacity	14	22
● Private sector	17	26
● process, vision	5	7
● LIMITATIONS	0	0
● Capacity	3	6
▼ ● education and training and expertise	17	26
● Communities	11	14
● Ministry Staff	9	16
● research	2	3
● financing	10	26
▼ ● Government-related	0	0
● coordination between levels of government	9	10
● Insufficient regulations	3	6

▼ ● LIMITATIONS	0	0
● Capacity	3	7
▼ ● education and training and expertise	17	26
● Communities	11	16
● Ministry Staff	9	16
● research	3	4
● financing	10	26
▼ ● Government-related	0	0
● coordination between levels of government	11	14
● ineffective management, mgmt plan	4	4
● Insufficient regulations	7	10
● interest,priorities, presence, support or m...	21	50
● Lack of Authority and Enforcement	15	32
● local perceptions, compliance, conflicts	7	13
● NGO and international designations	8	12
● paper parks	8	18
● POWER SHARING	4	4
● ResourcesStaff	15	28
● scaling up and replicability	2	4
● Turnover of government	8	11
● unfinished projects	2	2
▼ ● Recommendations on how to acheive effective...	28	53
● long term	3	3
● Opportunities	5	5
● Trending	3	7

Source: NVIVO

Table D3: Emergent themes after final coding and data collapsing/merging.

Themes (Name)	Sub Category	Number of times Informants referenced this topic
<b>I. Connectivity</b>		<b>132</b>
	A. Large Scale Initiatives	82
	B. Social	36
	C. Biological	14
<b>II. Considerations for Management</b>		<b>113</b>
	A. Perspectives on PAs	24
	B. Socio-Ecological Systems	73
<b>III. Current and Future Projects</b>	C. Stakeholder Incentives	16
		<b>87</b>
	A. Current Priorities	18
	B. Future	13
	C. Successes	21
	D. Threats	35
<b>VI. Governance Frameworks</b>		<b>61</b>
	A. Private Sector Involvement	26
	B. Devolution (co-management)	12
	C. Unified Vision (decision making and capacity)	23
<b>V. Limitations</b>		<b>257</b>
	A. Capacity	7

	B. Education and Training	37
	C. Financing	27
	D. Government-related	186
<b>VI. Recommendations for effective Management</b>		<b>60</b>

Source: NVIVO

## Appendix E

### E1: Semi-Structured Interview Questions

Project Title: Perspectives on Coastal and Marine Management in Dominican Republic

#### I. Introductions

- A.** Tell me a little about yourself, how did you become a (title)?
- B.** Are you familiar with the establishment of the CBC (UNEP)?
  - 1.** What do you know about it? Where did you get this information?
  - 2.** Any initial comments for improvement?
- C.** If no, are there other large-scale marine conservation initiatives you are aware of?  
Example CCI
- D.** Do you know what the process is for establishing these protected areas

#### II. Connectivity and biodiversity

- A.** What do you see the primary benefits of establishing parks and protected areas are?  
What is most valued?  
Are there model marine conservation initiatives in the DR that should be strengthened, expanded, or multiplied? Why can this be considered a model example? What benefits/ opportunities do you see connectivity initiatives such as linking existing PA's to DR? Limitations/barriers?
  - 1.** Example: Terrestrial and Marine areas, between and with surrounding countries

#### III. Social-ecological systems (livelihood impacts)

- A.** What are the most valued Ecosystem services in (X)?
- B.** What are the main sources of peoples' livelihoods/incomes in (X) area?  
Any comments on how to involve local communities in livelihood alternatives (example: non-extractive activities, ECO tourism development)?
- C.** In the areas you work what is the relationship between agencies and the conservation initiatives and community members?
- D.** Do communities have the capacity to adapt to alternative livelihoods? Such as?

#### IV. Governance frameworks (participatory management, community involvement, etc.)

- A.** Describe the role that your group has in provision of technical advice and/or local knowledge for implementation of marine conservation initiatives.
- B.** At what point was the community engaged in the management plan/process ( What role do local stakeholders play in the decision making process)
- C.** Are any important stakeholders/ actors currently missing from the decision-making process?

#### V. Conclusion / *Conclusión*

- A.** *Do you think the DR will achieve their current commitments to enhance the effectiveness of environmental protection? (Example CCI) How?*
- B.** *What is the direction you would like to see DR head going into the future to “integrate communities into a more sustainable relationship with nature, while conserving coastal and marine biodiversity”?*
- C.** *What aspects of the decision making process, or other themes we have discussed, should I continue to explore?*

## Appendix F

F1: Informant gender information based on scale

<b>Gender/Scale</b>	<b>Locale</b>	<b>Regional</b>	<b>National</b>	<b>International</b>	<b>Total</b>
<b>Female Informants</b>	2	3	5	2	12
<b>Male Informants</b>	4	8	8	3	23
<b>Total</b>	<b>6</b>	<b>11</b>	<b>13</b>	<b>5</b>	<b>35</b>

F2: List of Informants (Position, Level, Sector, Interview Date)

1. Executive Director, Regional, NGO, June 16th, 2014
2. Biologist, Regional, MoE-Coastal and Marine, June 20, 2014
3. Project Coordinator, National, MoE, June 24, 2014
4. Haiti - DR Liason, National, MoE Protected Area, June 24, 2014
5. Technical Staff, Regional, MoE, June 24, 2014
6. President, National, NGO, June 24, 2014
7. Director, National, MoE-Biodiversity, June 24, 2014
8. Technical Director, International, NGO, June 25, 2014
9. Communication Specialist, International, NGO, June 25, 2014
10. Vice Minister, National, MoE Coastal and Marine, June 27, 2014
11. Community Educator, Regional, Education, June 27, 2014
12. Conservation Science Director, National, NGO, July 2, 2014
13. Agronomist, Regional, NGO, July 2, 2014

14. University Investigator, Regional, Academia, July 3, 2014
15. Executive Director, Regional, NGO, July 7, 2014
16. Ecologist and Evolutionary Biologist, Local, Academia, July 8, 2014
17. Manager of Fisheries Association, Local, Primary Resource User, July 8, 2014
18. Marine Excursion Company Owner, Local, Tourism, July 9, 2014
19. Research Vessel Captain, National, Private hired by MoE, July 9, 2014
20. Park Administrator, Regional, MoE, July 14, 2014
21. Tourism Operator, Local, Tourism, July 14, 2014
22. President, International, Private, July 17, 2014
23. Environmental Director, Regional, Private, July 18, 2014
24. Project Coordinator, Regional, Private, July 18, 2014
25. Central Director, Regional, NGO, July 19, 2014
26. Director, National, MoE [Education], July 22, 2014
27. Chief Executive Officer, International, Private, July 24, 2014
28. Engineer/Volunteer, National, Armada, July 25, 2014
29. Proprietor, Local, Tourism, July 29, 2014
30. Deputy Director, National, Academic, July 29, 2014
31. Professor, National, Academia, July 30, 2014
32. Captain, Local, Primary Resource User, July 31, 2014
33. Research Professor, National, Academia, August 1, 2014
34. Program Officer, International, NGO, August 1, 2014
35. Senior Scientist, International, NGO, August 5, 2014

F3: Participant Information

**Interviewee # :** \_\_\_\_\_

**Age:** \_\_\_\_\_ **Sex:** \_\_\_\_\_

**Resident Town:** \_\_\_\_\_

**Position/Livelihood source:** \_\_\_\_\_

**Sector:** \_\_\_\_\_

**Date/Time of Verbal Consent:** \_\_\_\_\_

**Check the following that apply:**

\_\_\_\_ Agree to Participate

\_\_\_\_ Agree to be audio recorded

\_\_\_\_ Agree to be identified by name (verbally, not on record)

\_\_\_\_ Agree to the use of anonymized quotations in the report

**Date/Time of Interview:** \_\_\_\_\_

**Location of Interview:** \_\_\_\_\_

**Interview Audio Recorded:** YES / NO

**Interview conducted in:** English / Spanish

**Additional Comments/Notes**

F4: Letter of Information

### **A. Invitation to Participate**

*My name is Sondra Eger and I am a Masters candidate from the University of Waterloo in Ontario, Canada, and I am doing some research on marine resources and Protected Area Management in the Dominican Republic. My intention is to conduct research on the perspectives of marine resource users on marine conservation and management efforts specifically within the Dominican republic.*

*I am currently seeking candidates involved in coastal and marine research, conservation, Protected Area management, or education initiatives who may be willing to participate in an interview for my research. This may include being recorded, identified by name and have your anonymized quotations in the final report, upon your agreement. Your responses will be kept completely confidential.*

*If you are interested in participating, or would like to know more about the study please contact me. Additionally, if you know of any individuals who are involved in the previously mentioned fields, please provide me with their contact details at your convenience.*

*Thank you for your consideration.*

### **B. Purpose of Study**

The purpose of this research is to determine how the livelihoods of coastal communities in the Dominican Republic are likely to be affected by the expansion and further establishment of marine conservation initiatives, such as protected area (PA) networks. These include the Convention of Biological Diversity (CBD), Caribbean Challenge Initiative (CCI), and the Caribbean Biological Corridor (CBC). Connectivity conservation initiatives are increasing in prevalence as a diverse array of benefits are continually being demonstrated through these models, such as marine protected area (MPA) networks. The benefits of these initiatives include, preserving biodiversity and ecosystem services, adapting to climate change impacts, allowing for long term protection of natural resources and threatened species, and supporting the transition into more resilient coastal communities.

The Dominican Republic is a biodiversity hotspot meaning it's extremely important to conserve the often threatened species in these regions. In order to efficiently secure marine natural resources for the future, the knowledge and concerns of coastal community

members must be considered to ensure effective protection and regulation compliance. Therefore there are several other intentions of this research. Firstly, to examine the government frameworks in place and determine the degree to which they consider local resource users in the decision making process for natural resource management. Secondly, to identify potential opportunities within social-ecological systems to reduce livelihood impacts from conservation efforts, such as the establishment of marine parks or protected areas. Lastly, to assess the perceptions on biodiversity conservation via connectivity initiatives that speak to the DR's commitment to increasing ecosystem protection and acknowledging the value of MPA and PA networks.

By gaining insight on the interactions of marine resource stakeholders/users with coastal and marine conservation initiatives within the DR, I hope to achieve the following: document proposed methods for reducing the negative impacts associated with these efforts, determine potential alternatives to traditional subsistence fisheries, and identify possible opportunities that may lie in the tourism realm. An overarching goal is to attempt to further understand coastal ecosystems, assist in developing coastal areas responsibly while considering management implications local communities and conduct a multi level stakeholder analysis for marine natural resource management.

Coastal and marine based initiatives are important because these sectors are valuable to the social, economic and biological functions of many Caribbean islands, such as the Dominican Republic. These environments contribute to the foundation of the tourism industry, national GDP, livelihoods of the country's inhabitants as well as the biodiversity of the region.

### **C. Inclusion Criteria**

Resource users that represent a variety of sectors related to marine resource management and conservation will be targeted for the interview process. Participants will be representative of both genders within the Dominican Republic most likely between the ages of 18-65.

These participants will be involved with the following areas (but not limited to): government representatives (Ministry of Environment), non-governmental organizations, tourism (business owners, hospitality), park managers and staff, community representatives, etc. All participants will have some direct or indirect links to marine resources and at times, involved in Protected Area management.

### **D. Exclusion Criteria**

Minors under 18 will not be participating in the study.

#### **E. Activities of Participants and Compensation**

You will receive a copy of this Letter of Information in your language of preference (Spanish or English), as well as be verbally informed of the study, should you prefer. If you agree to participate, you will confirm your consent by verbally stating what you are agreeing to back to the researcher (and translator/research assistant) to show your understanding. The researcher has a beginner - intermediate level of Spanish comprehension and conversation skills, and therefore will be accompanied by a research assistant/translator throughout the interview process.

You will be asked a series of questions in an informal, semi-structured interview setting, a translator will be used if necessary. It is anticipated that the entire task will be completed within 1 hour, over 1 session. However, you may be contacted for a second interview/session. The interview will be conducted somewhere you are comfortable [**or insert location**], perhaps a local dining establishment.

#### **F. Possible Risks and Harms**

There are no known or anticipated physical, psychological, or emotional risks or discomforts associated with completing this study.

#### **G. Possible Benefits**

The possible future benefits to participants and society may include, but not limited to: help ensure the sustainability of highly coveted marine resources; have the concerns and ideas of all marine resource users considered in the decision making process; ensure that local knowledge is incorporated and valued in management strategies; promote the education on current issues that face the marine realm and in turn the livelihoods of subsistence based and small scale actors. As well as assisting with the development of more inclusive and effective marine protected area frameworks, while ensuring sustainable resource development and livelihood security.

#### **H. Voluntary Participation**

Thank you for agreeing to participate in this research project dealing with Protected Area Management. Any information you share with us will not be associated with you personally when we write up the results of this research. Your comments will be anonymous, your participation will be confidential, and the tapes of your interview will be kept in a safe place to ensure that only those directly involved in the research (the researcher, Sondra Eger, and

our research assistants/translator, <names and affiliations if known>) will have access to them. We will also ensure that our translators and/or research assistants are aware of and respect the confidentiality of your participation.

If there is any question that you prefer not to answer, just tell me and I will go on to another one. If necessary, the interview can also be stopped at any time if you wish. If you decide later that you do not want your interview included in our research, just let us know and we will not use the information and will dispose of the tape and transcript of your interview.

### **I. Confidentiality**

All data will remain confidential and accessible only by the investigators of this study. If the results are published, any information that may possibly link the data to your identity will not be used. Furthermore, a translator and/or research assistant may be used, but they will keep any disclosed information confidential.

### **J. Other Notes**

Research Assistants/translators will likely have a post-secondary level of education, or be suggested by a collaborating organization that has worked before in such research and local interview scenarios. They will be briefed with the expected protocol of the study, including: general responsibilities; informed consent process; interview characteristics; and transcription method.

### **K. Contacts for further Information**

This project was reviewed by, and received ethics clearance through a University of Waterloo Research Ethics Committee. Should you have any comments or concerns resulting from your participation in this study, please contact Dr. Maureen Nummelin, Chief Ethics Officer, Office of Research Ethics, at 1-(519)-888-4567, Ext. 36005 or [maureen.nummelin@uwaterloo.ca](mailto:maureen.nummelin@uwaterloo.ca).

During the time in DR, from June-August 2014, the translator/research assistant will accept calls in spanish at this number <enter number>.

Anytime after September 2014, the University of Waterloo in Ontario, Canada at 1 (519) 888-4567 . They will accept collect calls in English.

If you would like to receive a copy of any potential study results, please contact Sondra Eger, [seger@uwaterloo.ca](mailto:seger@uwaterloo.ca), where Spanish emails will be translated.

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