# Ecosystem Services and Social Wellbeing Linkages: The Impact of a Marine Protected Area in Bluefields, Jamaica

by

Cheryl Chan

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Environmental Studies
in
Environment and Resource Studies

Waterloo, Ontario, Canada, 2017

# 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.

I understand that my thesis may be made electronically available to the public.

# Abstract

This thesis examines the linkages between ecosystem services (ES) and social wellbeing (SW) for a small-scale fishing community, and analyzes how these linkages have changed in relation to the implementation of a marine protected area (MPA). The case study for this research is Bluefields, a community in Westmoreland Parish, Jamaica. The Bluefields Bay Special Fishery Conservation Area (BBSFCA) is a no-take MPA that was established in the community in 2009 to promote the recovery of declining fish stocks. This MPA has a direct social and ecological impact on approximately ten adjacent communities and 400 small-scale fishers in Bluefields Bay. The following four objectives guide this research: 1) to identify the ecosystem service bundles (i.e., interconnected ES) that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers); 2) to define how the MPA has changed access to ES bundles for these different groups; 3) to examine how changes in access to these bundles have affected social wellbeing; and 4) to apply understanding of ES and SW to enhance the governance of MPAs (e.g., siting, design, management).

This research uses a qualitative case study based mixed-methods approach. Research began with the review of primary and secondary literature. Subsequent fieldwork components included: 1) participant observation; 2) 42 semi-structured interviews (n=59 people); 3) six focus groups (n=44 people); and 4) 77 structured questionnaires (n=77 people).

Major findings from this research indicate that, first, both fishers and non-fishers emphasized the importance of provisioning (e.g., fish, lobster) and cultural ecosystem services (e.g., cultural heritage, knowledge systems), and their bundled qualities (e.g., fish as food, livelihood, and cultural celebration). Fishers also noted interconnections between provisioning and supporting ecosystem services (e.g., water cycling, biodiversity)—particularly the bundling of fish with habitat and refugia (e.g., fish stocks increase when habitats are healthy and accessible). Second, inshore fishers, in comparison to offshore fishers and non-fishers, are the most impacted by the implementation of the MPA. Furthermore, inshore fishers have become the most marginalized in governance processes, despite experiencing the greatest negative change to ecosystem service access and social wellbeing. Third, co-management (i.e.,

collaboration between state and local actors) may be the most appropriate mode of governance for the BBSFCA. However, there are several challenges preventing effective co-management in Bluefields, including: 1) disagreement over management objectives (e.g., managing to enhance provisioning ES, versus managing to maintain cultural ES access); 2) a lack of opportunity for meaningful participation (e.g., issues surrounding trust and advocacy); and 3) the need to strengthen social networks (e.g., increase relational wellbeing between core actors and marginalized groups). Current management objectives of the MPA are misaligned with the needs of marginalized groups, thereby indicating a tradeoff between conservation and wellbeing. This tradeoff is a source of conflict that inhibits capacity building and weakens local fisher institutions—in turn, inhibiting governance of the MPA.

Ultimately, this thesis contributes to resolving tensions between small-scale fishing communities and conservation initiatives. Findings on ecosystem services and social wellbeing support the need to treat coastal-marine systems as multi-faceted, with rich social and cultural dimensions. To enhance compliance and legitimacy of conservation efforts in small-scale fishing communities, this research advocates for coastal-marine governance that acknowledges and reflects these intangible dimensions.

# Acknowledgements

First and foremost, I would like to thank the community of Bluefields. Without your support, the next 200 pages would literally be blank. Specifically, I would like to thank the Bluefields Bay Fishermen's Friendly Society and the Bluefields People's Community Association for helping me settle in and orient myself in the ever wild but beautiful chaos of Jamaican culture. On that note, I would also like to express my gratitude for people in the districts of Auldayr, Belmont, Cave, Mearnsville, and Paradise. Thank you for inviting me into your homes, and for giving me lessons on life that extend beyond this thesis. Finally, in no specific order: Heidi, Brigit, Veda, Marie, Venis—you are all fierce Jamaican women from whom I have learned so much, thank you for taking care of me. Wolde, thank you for helping me coordinate my research, and for connecting me with Susan and the other fantastic community researchers that I worked with. Finally, a special shout-out to my favourite little girl, Ava, for being happy to see me every day, and for being a source of joy on some especially tough field days.

To the Environmental Change and Governance Group, it's taken me so long to finish this degree that I feel like I've gotten to know so many of you. Thank you for your endless support—writing groups, presentation run-throughs, coffee dates, etc. To my supervisor, Derek: before I started this degree, I was an unconfident and formerly average student who had been out of school for years and trying to transition to a new discipline. Your gentle encouragement has supported my growth as a young researcher, given me courage, and allowed me to flourish in ways that I never thought possible. I hope that I, at the very least, have reciprocated some of this kindness by teaching you to water the plant in your office. Seriously, if it died, I would be very disappointed—it's practically a cactus.

In my time at Waterloo, I have had the good fortune of working with many invaluable mentors. Steve, thank you for guiding me through the complicated (formal and informal) process of conducting research in Jamaica. Beth, your approach to life is so inspiring. Thank you for teaching me about the importance of balance, and for your friendship. Evan, I hope that I will one day be as brilliant as you. Thanks for all the movie dates and for driving me around like Miss Daisy. Graham, I can't say that I understand you 100% of the time, but you always

give unique and crucial advice on all things academia and adulting (sometimes, things actually percolate)—but seriously, how do I perform this crowding theory analysis and what is an investment portfolio? To my committee member, Simon, you were so generous with your time and supportive throughout this whole process, I cannot thank you enough.

I've met so many great friends in Waterloo that it would take forever to list you all, but you know who you are! To my friends and family back home: Joanna, I think we've been on the same (strange) wavelength since we were 15—when people thought that we were weird, because, you know, they don't think that anymore, obviously. You legitimately make me laugh pretty hard, like, all the time—laughing is important when you're feeling stressed about life. Also, I haven't forgotten that you picked me up from the airport each time that I came back from the field. I think one time you even greeted me with a box of those Costco Christmas chocolate crepe things. In all seriousness, you're the best friend a person could ever ask for (except when you're an hour late to everything which is pretty much all the time except when you're picking me up from the airport). Redford, did I tell you that I typed out most of my thesis on my Das Keyboard? It was a critical tool for completing this dissertation! Also, thanks for sending me all those cute videos of Charlie et al., they made me laugh and smile all the time. To my parents, even though Joanna would pick me up from the airport but you wouldn't, I still love you. You haven't said anything about all my wacky career changes in life, and that means a lot. Plus, every year you help me schlep my stuff around when I'm moving in and out of different houses, I know how much you hate that because you complain about it all the time, but you do it anyway. Mom, for the last time, it's not productive to stand there staring at the pile while wondering anxiously if it will all fit into our Nissan Rogue.

# Dedication

I dedicate this thesis to my partner, Jos Campbell.  Thank you for teaching me to be kinder and more patient, and for Skyping with me every night while I was in the field.  More importantly, thank you for teaching me your secret mac and cheese recipe.  Mac and cheese (and sometimes peas and chili flakes) got me through a lot of tough days during this degree.  I occasionally deviated from gourmet and had the boxed variety, or, when I was feeling mid-level fancy, the organic boxed variety.  I'm sorry, I know how you feel about that.  As you know, your recipe requires a lot of whisking and waiting.  I was working on my thesis all the time (obviously), I didn't have time for that!  I should just dedicate this thesis to mac and cheese, maybe.


Anyway, I love you.

# Table of Contents

# List of Figures

# List of Tables

# List of Boxes

# List of Acronyms

| | |
|---|---|
| BBFFS | Bluefields Bay Fishermen's Friendly Society |
| BBSFCA | Bluefields Bay Special Fishery Conservation Area |
| BCDC | Bluefields Community Development Committee |
| BPCA | Bluefields People's Community Association |
| CBD | Convention on Biological Diversity |
| CCI | Caribbean Challenge Initiative |
| ES | Ecosystem Service |
| FAO | Food and Agriculture Organization of the United Nations |
| MA | Millennium Ecosystem Assessment |
| MOAF | Ministry of Agriculture and Fisheries |
| MPA | Marine Protected Area |
| NEPA | National Environment & Planning Agency |
| NGO | Non-Government Organization |
| SSF | Small-Scale Fishery |
| SW | Social Wellbeing |
| UN | United Nations |
| UNEP | United Nation Environment Programme |
| WB | Wellbeing |
| WWF | World Wildlife Fund |

# Chapter 1

## Introduction

This research highlights governance challenges associated with small-scale fishing communities, and the protection and use of coastal-marine resources. According to the Food and Agriculture Organization of the United Nations (FAO), small-scale fisheries (SSF) are "firmly rooted in local communities, traditions and values", with self-employed fishers who fish primarily for "direct consumption within their households or communities" (FAO, 2015b, p. v). Small-scale fishing communities are facing many challenges, including globalization (e.g., encroachment from other industries such as tourism), marginalization, and climate change (e.g., sea level rise, increasing sea surface temperatures) (Bavington & Kay, 2005; FAO, 2014; Nayak et al., 2014; Wilkinson & Salvat, 2012). These challenges make the governance of small-scale fisheries for livelihood benefits and conservation a significant global challenge (Birkeland, 2017; Bundy et al., 2016; Campbell et al., 2016; Lynch et al., 2016). In this research, I define governance as

> the integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change and, in particular, earth system transformation, within the normative context of sustainable development. (Biermann et al., 2012, p. 279)

Governance is an overarching theme in this research because it provides tangible benchmarks and characteristics (e.g., decision-making, participatory processes, monitoring and evaluation) through which to examine the multi-dimensional challenges confronting small-scale fishing communities. However, I examine the related challenges of governance, small-scale fisheries and the protection and use of coastal-marine resources (in this research, through marine protected areas) using two lenses: 1) ecosystem services (ES) and 2) social wellbeing (SW) (see Chapter 2 for overview of these concepts and their linkages). To better understand the systems of governance in Bluefields, I use ecosystem services and social wellbeing frameworks to explore motivations (e.g., what people value from ecosystems, what people prioritize for livelihood and conservation) and relationships (e.g., what social barriers and opportunities exist for livelihood fulfillment and conservation). Ecosystem services are broadly defined as "the

1

benefits people obtain from ecosystems" (MA, 2005, p. v), where "bundles" are the mutual interdependence of many of these services. Social wellbeing, on the other hand, is "a state of being with others, where human needs are met, where one can act meaningfully to pursue one's goals and where one enjoys a satisfactory quality of life" (McGregor, 2008). Interest in ecosystem services and social wellbeing across government, NGO, and academic sectors has increased since the publication of the Millennium Ecosystem Assessment (2005), and recent studies have drawn attention to their combined analytical utility (Daw et al., 2016; Hamann et al., 2016; Smith et al., 2013).

There are a number of conservation strategies to protect coastal-marine ecosystem services, such as the implementation of marine protected areas (GOC, 2013; Halpern & Warner, 2002; Spalding et al., 2016). Marine protected areas are designated areas where human activity (e.g., fishing, shipping) is restricted for conservation purposes (IUCN, 2015a). These restricted fishing zones can augment ecosystems and, in some instances, human welfare and wellbeing after a prolonged period of ecological recovery (IUCN, 2015a; Reithe, 2014). The purpose of marine protected areas is to promote the recovery of ocean ecosystems (e.g., to increase fish populations, to allow coral reefs to recover, to enhance biodiversity). However, while MPAs may promote long-term ecological benefits, in the short term, they may cause harm to small-scale fishing communities that depend on the ocean for daily survival (e.g., fish as economic resources, food security). Therefore, to increase MPA compliance and legitimacy, there is a call from MPA actors to better understand how these protected areas can meet their long-term objectives while minimizing short-term impacts on small-scale fisheries. In this regard, the linkages between ES and SW may steer MPA governance processes (e.g., planning, design, management) towards mitigating or avoiding potential negative impacts on these communities.

## 1.1 Research Goal and Objectives

This research assesses the linkages between ecosystem services and social wellbeing in small-scale fishing communities, and analyzes how marine protected areas impact these linkages. The specific objectives of this project are to:

1) Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);

2) Define how a marine protected area (MPA) has changed access to these bundles for each group;

3) Examine how changes in access to these bundles have affected social wellbeing (SW) (i.e., material, subjective, and relational wellbeing); and

4) Link ES and SW insights to enhance the governance of MPAs (e.g., siting, design, management).

Identifying the key benefits (i.e., ES) that communities value from ecosystems is a crucial step in prioritizing governance objectives.  Defining relationships between ecosystem services and social wellbeing may provide a novel social-ecological perspective to glean new insights on the challenges and opportunities confronting coastal communities in the face of global change (Bryant et al., 2011; Dolan & Walker, 2006; Kittinger et al., 2015; Wilkinson & Salvat, 2012). Further, these relationships highlight the transdisciplinary nature of conservation, and provide support for acknowledging the human dimension in conservation initiatives.  Knowledge of this human dimension is fundamental to navigating the governance of natural resources, where human interactions and relationships determine success or demise.

## 1.2 Research Design

My research uses a qualitative case study based methodology and incorporates a mixed methods approach (Chapter 4).  The methodology emerges from elements of grounded theory (Glaser, 2008) to permit adaptability in research design.  Grounded theory is defined as "theory…derived from data systematically gathered and analyzed through the research process" (Strauss & Corbin, 1998, p. 13).  In this context, my research merges inductive elements (e.g., by inductively exploring emerging themes during the coding process, such as context-specific facets of social wellbeing) with deductive elements (e.g., by deductively coding data using themes provided by existing literature, such as predetermined ecosystem service categories) to apply a conceptual framework that links ecosystem services, social wellbeing and the governance of small-scale fisheries in the context of marine protected areas.  Specifically, the following data collection

methods were incorporated: 1) literature review; 2) participant observation; 3) semi-structured interviews; 4) focus groups; and 5) structured interviewer-administered questionnaires. Literature review throughout the project was ongoing, but field research (i.e., components two to five in the preceding list) took place during June to November 2015.  Further information on the methodological approach and methods are provided in Chapter 4.

## 1.3 Case Study

The case study for this research is Bluefields, a community in Westmoreland Parish, Jamaica. Bluefields is located adjacent to Bluefields Bay, which includes the Bluefields Bay Special Fishery Conservation Area, a no-take MPA.  This section will describe the regional and local details of the case study, with additional details on the context of Bluefield's small-scale fisheries provided in Chapter 3.

### 1.3.1 National Context

Jamaica is a neotropical country and the third largest island in the Caribbean Sea with a total surface area of approximately 11000 km$^2$ (WWF, 2015).  The national population is 2.8 million people, resulting in a population density of 255 people/km$^2$.  Both rural and urban areas have grown between 2010 to 2015, at an average annual rate of 0.5% (UN, 2015; WWF, 2015).  In 2013, Jamaica's GDP per capita was US$ 5,126 (UN, 2015) with 56% of females and 71% of males participating in the labour force.  Still, unemployment rates have increased since 2005, and were last recorded at 15% for age groups 14 years and over (UN, 2015).  Educational enrolment records show that 94 out of 100 school-aged children are in school, with these figures being equal for both males and females (UN, 2015).  The service industry—of which tourism is a central component—is the primary economic activity in Jamaica (UN, 2015).  Two million tourists visited the island in 2015, doubling from one million in 1995 (World Bank, 2016), and these numbers continue to grow with each passing year (Jamaica Tourist Board, 2015).

Jamaica is home to 292 known threatened species (UN, 2015).  The country's protected area network contains an estimated 139 parks and reserves (UNEP, 2015), but these areas are facing governance issues from a lack of public awareness and political support (WWF, 2015).  In conjunction with the development of Aichi Biodiversity Targets, the Convention on Biodiversity

4

(CBD) has aimed to increase the total percentage of protected coastal and marine areas to 10% by 2020 (CBD, 2013). As an official Party to the Convention on Biological Diversity (CBD) and a signing (albeit non-ratified) member of the Cartagena Convention (CEP, 2015), Jamaica is committed to achieving Aichi Biodiversity Targets (CBD, 2015) and the Caribbean Challenge. The Caribbean Challenge is aiming to conserve at least 20% of the coastal-marine environment by 2020 (CCI, 2013). Finally, Jamaica's National Development Plan, titled "Vision 2030 Jamaica", addresses environmental protection and provides further policy impetus to preserve and protect natural resources (Planning Institute of Jamaica, 2012).

As part of the Vision 2030 Plan, Jamaica's development goals involve creating a network of terrestrial and marine protected areas, with 17% and 20% coverage, respectively (CCI, 2013; Planning Institute of Jamaica, 2012). The National Environment and Planning Agency (NEPA) reports that Jamaica is on track to reach these goals, with a current system of protected areas that includes 2,000 km$^2$ of terrestrial area (i.e., 18% coverage) and 1,800 km$^2$ of marine area (i.e., 15% coverage) (NEPA, n.d.). Thus, despite existing problems with the governance of protected areas, the implication of this target is an expansion and increase in number of MPA networks worldwide—including the Caribbean region (CBD, 2013). Still, in past decades, management effectiveness for 48% of the MPAs in the Caribbean region has been assessed as inadequate, and a further 33% have unknown effectiveness (Burke & Maidens, 2004). The rapid pace of MPA emergence points to an urgency to better understand how protected areas affect individual and community wellbeing, and how they might be governed more effectively.

In addition to the governance challenges noted above, environmental changes are a significant concern. For example, Jamaica currently faces threats from climate change, including: 1) an increase in average atmospheric temperature (2.9-3.4°C by 2080); 2) reduced average annual rainfall (by 10-41%, particularly between March to August); 3) increased sea surface temperature (SST) (0.9-2.7°C by 2080); and 4) an increase in tropical storm intensity (historical trends over the last 30 years have indicated this increase, data projects that this trend may continue) (CARIBSAVE, 2012). An additional threat is sea level rise (SLR), which is conservatively projected at 0.5 m from now until the year 2100 (CARIBSAVE, 2012). As a Small Island Developing State, much of Jamaica's infrastructure is located along its coastline.

5

SLR induces coastal erosion and consequently poses a threat to coastal residents, most of the Jamaican population—over 50% of the Jamaican population lives within 1.5 km of the shoreline (CARIBSAVE, 2012). Furthermore, 90% of the island's GDP (US$14,795 million in 2012) relies on its coastal zone (CARIBSAVE, 2012; UN, 2015), with coastal tourism being Jamaica's "largest foreign exchange earner" (CBD, 2015). Losses in this industry from SLR could grow to US$ one billion annually by 2050 and to US$8.7 billion annually by 2080. Unsurprisingly, two-thirds of Caribbean reefs are threatened by human activity (e.g., coastal development). Threat levels for Jamaican reefs are between medium to very high (Bryant et al., 2011). Mitigating the issues surrounding coastal-marine governance and broader environmental changes are crucial for the future of the country. This research contributes to resolving these issues by helping to identify and address them through an ES and SW lens.

### 1.3.2 Local Context

Bluefields is a community situated along the coastal shoreline of Bluefields Bay, once a commonly fished inlet of the Caribbean Sea (Figure 1.1). According to community members, the community of Bluefields is composed of multiple districts (Participant 4, personal communication, Nov 25, 2015). For this research, individuals located in the following districts were included: Auldayr, Belmont (including Black's Bay), Cave, Mearnsville, and Paradise. Bluefields Bay is the location of the Bluefields Bay Special Fishery Conservation Area (BBSFCA), an MPA with a large impact on surrounding communities and towns (e.g., Bluefields, Savannah-la-Mar). The BBSFCA was logistically chosen for several reasons: 1) the scale of the MPA and surrounding fishing communities was manageable for research, while providing enough explorative breadth; 2) existing research networks and collaboration; 3) related to the previous point, there was opportunity to build upon existing research in the community (e.g., Alexander et al., 2015; C-FISH, 2015; Rudolph, 2012); and 4) accessibility. From an empirical perspective, the BBSFCA was implemented in 2009, and as such, the community is in a unique position to distinguish changes that resulted from the implementation of this MPA.

**Figure 1.1 Map of Jamaica with box highlighting the location of Bluefields and Bluefields Bay (The University of Texas At Austin, 2002).**

Bluefields, home to the operational center of BBSFCA, is in Westmoreland, the western-most parish of Jamaica.  The Bluefields People's Community Association, a grassroots organization formed in the late 1980s, serves as an informal predecessor and present day convener for the Bluefields Community Development Committee (BCDC), a registered Community-Based Organization formally recognized by the national government.  Despite being formally registered as the BCDC, the group (and many within the community) still refers to itself as the Bluefields People's Community Association (BPCA).  In this thesis, I acknowledge that the group's formal designation is the BCDC, but I refer to it as the BPCA.  The BPCA represents a diverse range of community interests and actors (e.g., the Bluefields Bay Friendly Fishermen's Society [BBFFS], the Westmoreland Organic Farmers' Society [WOFS], Bluefields Basic School).  As a civil society, the BPCA has worked towards achieving four self-nominated goals:

7

1) education for all; 2) food for all; 3) jobs for all; and 4) the preservation of the natural environment (Participant 19, personal communication, Jul 28, 2015) (Figure 1.2).
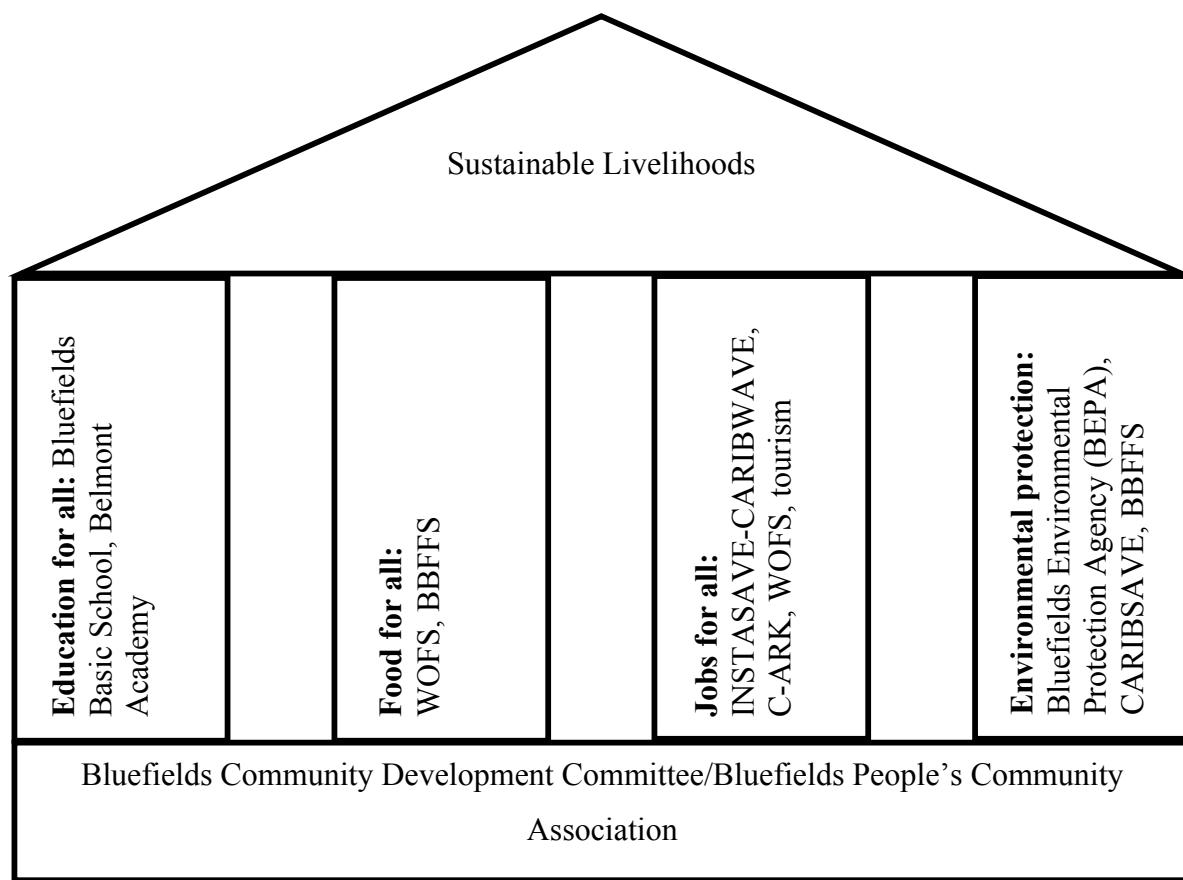


**Figure 1.2 The "four pillars" of the Bluefields community.**

In doing so, the BPCA has explored the expansion of Bluefields' service industry (e.g., tourism, hospitality) as a means of alternative livelihood for the community.   In the local context, the benefits of shifting from a resource-based economy towards a service-based economy are posited as follows: 1) burden on the environment will decrease as emphasis shifts away from resource extraction; 2) upon recognizing a positive correlation between improved environmental condition and tourism opportunities, community members may become more engaged in conservation; and 3) males who traditionally sacrifice education to enter resource-based industries at an early age (e.g., fishers) may instead have the opportunity to prioritize

education and literacy, leading to increased family earning power overall (Participant 19, personal communication, Jul 28, 2015).  Nevertheless, there are many challenges associated with these development goals, which will be discussed in later a chapter (Chapter 3).

The challenges emerging for the BPCA run parallel to those hindering conservation initiatives—for example, the struggle to balance the ecological goals of the BBSFCA, while navigating the community's socioeconomic needs.  To achieve "good" governance of the MPA, Bluefields must succeed in holistically addressing other related sustainability challenges, both social and ecological (i.e., the interrelated goals of food, education, and jobs for all, and environmental protection).  Upon addressing these challenges, fishers would have opportunities to lead fulfilling and meaningful lives outside of their traditional livelihood dependencies.

## 1.4 Thesis Structure

The relationship between ecosystem services and social wellbeing highlights the embeddedness of humans in nature (Chan et al., 2016; Flint et al., 2013; Hamann et al., 2016).  This thesis will present an empirical assessment of this relationship—as they relate to coastal-marine conservation and governance of small-scale fisheries.  Chapter 1 has introduced the main purpose and theoretical components of this research, and provided an overview of the case study context.  In Chapter 2, I provide a review of relevant literatures (i.e., coastal-marine governance, ecosystem services, social wellbeing) and conclude with the conceptual framework for this research. In Chapter 3, I expand on the case study context and present specific challenges and opportunities for coastal-marine governance in Bluefields.  In Chapter 4, I outline the methodological approach and methods used to conduct the research.  Next, in Chapter 5, Chapter 6, and Chapter 7, I present the key findings on ecosystem services and social wellbeing, and then discuss their implications for governance of small-scale fisheries in Chapter 8.  Lastly, Chapter 9 is a conclusion of this thesis that emphasizes key insights and contributions.

# Chapter 2
# Literature Review

I begin this chapter with a synthesis of the relevant histories, definitions, challenges, and critiques associated with the central concepts of this research: 1) marine protected areas (MPAs) and the associated governance challenges of MPAs (Sec 2.1); 2) ecosystem services (ES) (Sec 2.2); and 3) social wellbeing (SW) (Sec 2.3). Small-scale fisheries (SSF), which are also crucial to the context of this case study, will be addressed in Chapter 3. In the following sections, I provide a summary of the literature on these concepts with reference to my research objectives. Finally, I conclude by introducing the conceptual framework for this research (Sec 2.4).

## 2.1 Governance of Marine Protected Areas

In this section, I examine: 1) the international definition and categorization of MPAs; 2) governance challenges of MPAs; and finally, 3) critiques of MPAs in relation to their impacts on small-scale fishing communities. This review of existing literature on MPAs will provide context for the challenges being faced by the fishing community of Bluefields in the governance of the Bluefields Bay Special Fishery Conservation Area (BBSFCA).

### 2.1.1 Marine Protected Areas

A marine protected area is a conservation approach identified by the International Union for Conservation of Nature and Natural Resources (IUCN) as 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" (Dudley, 2008, p. 8). The origin of MPAs is embedded in a sequence of fishing regulation policies, beginning with the 1958 Geneva Conventions on the Law of the Sea to establish an international legal framework for marine protection. This legal framework was supplemented by the Ramsar Convention (1971), UNESCO World Heritage Convention (1972), and the UNEP Regional Seas Programme (1974) (Thorpe et al., 2011). Subsequently, in 1975, the World Conservation Union (now the IUCN) convened a conference to discuss the establishment of a global network of MPAs for marine conservation. Classification of MPA types may vary from country to country,

but international guidelines follow the same IUCN classifications for both terrestrial and marine ecosystems (Table 2.1).

**Table 2.1 IUCN's MPA classifications, as defined by features and primary objectives.**

|  | Distinguishing Features | Primary Objective |
|---|---|---|
| **Ia** | Strict protection of biodiversity and geodiversity, where human visitation and use is highly controlled | To conserve ecosystems that are biologically and/or geologically unique, these ecosystems are incredibly sensitive to anthropogenic impact |
| **Ib** | Protection of areas retaining their natural characteristics in the absence of human influence, to preserve this natural condition. | To ensure long-term and inter-generational ecological integrity of undisturbed ecosystems |
| **II** | Protection of whole ecosystems where "environmentally and culturally compatible spiritual, scientific, education, recreational" activities are permitted | To protect biodiversity while promoting education and recreation |
| **III** | Protection of specific "natural monuments" (e.g., caves, landforms, sea mounts) | To protect unique natural features and their associated biodiversity and habitats |
| **IV \*** | Protection of particular species or habitats | To "maintain, conserve and restore species and habitats" |
| **V\*** | Protection of area where unique ecological, biological, cultural and scenic value has emerged as a result of human interaction | To protect landscapes/seascapes that have been created by humans through traditional management practices |
| **VI \*** | Protection of ecosystems with high cultural values and/or traditionally and sustainably managed natural resource systems. | To protect ecosystems where conservation and sustainable use are mutually beneficial |

*Applicable to the Jamaican PA network (UNEP, 2015)*

There are no "pristine spaces" in Jamaica (i.e., spaces devoid of anthropogenic forces). As such, 87% of protected areas on the island have become a conservation tool to encourage sustainable use (i.e., IUCN Category VI) (Figure 2.1) (UNEP, 2015). However, the BBSFCA was geospatially sited because it was an area that lacked traditional and sustainable natural resource management (Participant 19, personal communication, Aug 16, 2015). Although there is no formal categorization of the BBSFCA following the IUCN framework, evidence from community members indicates that the MPA is consistent with a Category IV designation, as it was initiated to protect Bluefields' coral reef and sea grass habitats from further exploitation.
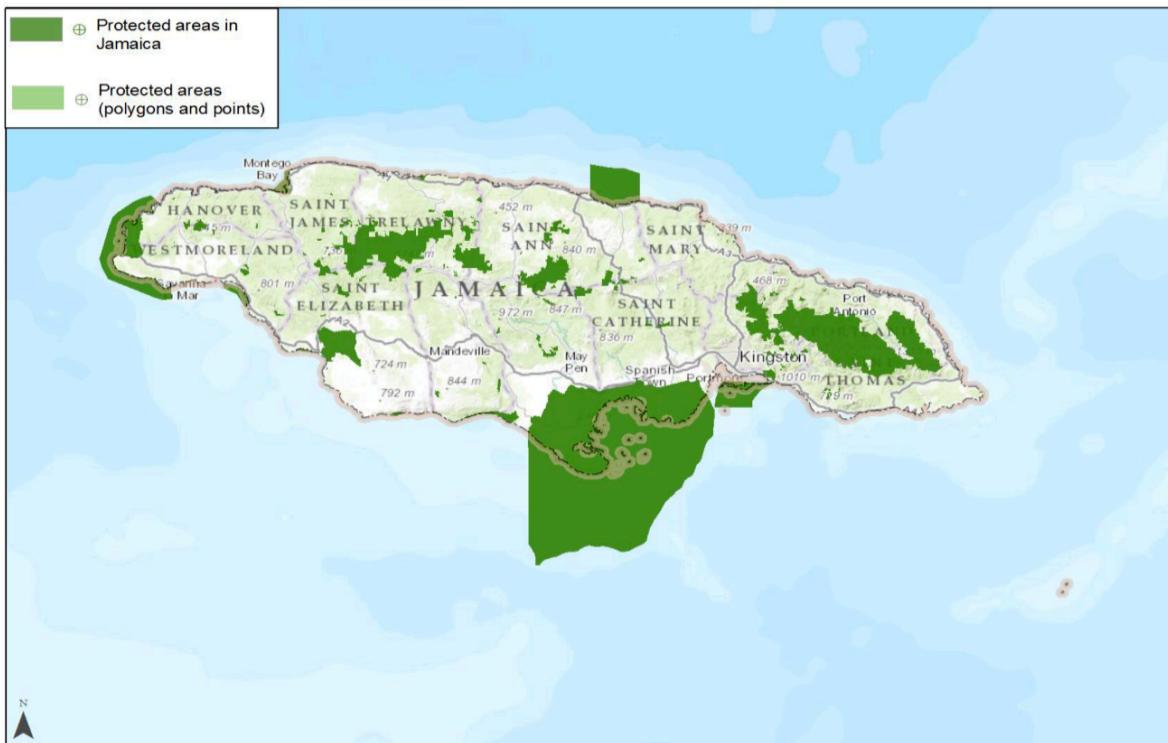
**Figure 2.1 Map of protected area coverage in Jamaica (UNEP, 2015, p. 1).**

## 2.1.2 Governance Challenges

Governance, defined in Chapter 1 (p. 1), transcends management (e.g., day-to-day activities of resource regulation) in that governance is seen as a shared responsibility that should be practiced by all actors (beyond those who are traditionally considered as "managers") (Bavinck et al., 2005). The governance of coastal-marine systems is a wicked problem (Jentoft & Chuenpagdee, 2009). Wicked problems are difficult to define and the solutions to these problems: 1) are not true-or-false, but rather, are either better-or-worse; 2) are not immediately or definitively testable; and 3) are not "once-and-for-all" (Rittel & Webber, 1973). As such, no single solution or management tool will suffice in solving the problems of coastal-marine governance (Jentoft & Chuenpagdee, 2009). Economic, environmental, and social interests often collide over the principle that coastal-marine resources are highly fluid and dynamic (Jentoft & Chuenpagdee, 2009). For example, migratory fish stocks lack tangible physical boundaries, posing barriers for resource monitoring (Berkes, 2005a). These and other challenges of coastal-marine governance

12

have led to oceans becoming increasingly degraded.  Symptoms of this degradation include ocean warming, acidification, deoxygenation (i.e., the "deadly trio"), pollution, increased extinctions, coral reef mortality, and sea level rise (Bijma, Yesson, et al., 2013; Bryant et al., 2011).  Likewise, these resources face direct human threats from coastal development and overfishing (Bavington, 2010; Bryant et al., 2011; Burke & Maidens, 2004).

Previous research has advocated for the crucial role that communities play in marine conservation initiatives (Agrawal & Gibson, 1999; Berkes, 2003, 2005b, 2007).  Yet, there are known conflicts between the emergence of MPAs and the livelihoods of fishing communities (Chap 3.4.2), particularly when these MPAs follow a traditional top-down governance approach that disregards community context (Bennett & Dearden, 2014; Masud & Kari, 2015).  Further, while MPAs support the recovery of coastal-marine ecosystems (Selig & Bruno, 2010), Wells et al. (2016) found a knowledge gap in the contributions of MPAs to maintaining ES.  This thesis supplements and offers response to these findings by: 1) providing empirical evidence of coastal-marine ES (e.g., what benefits people care about, how these benefits are impacted by the MPA) and their impacts on wellbeing (e.g., how ES access impacts livelihoods) in the context of MPA implementation (Chapter 5 and Chapter 6); 2) suggesting avenues for mitigating trade-offs between conservation and wellbeing by drawing from an analysis of ES and SW (e.g., how to strengthen institutions, who controls access to benefits) (Chapter 7); and 3) using this analysis to investigate both top-down and bottom-up MPA governance challenges (Chapter 8).

### 2.1.3 Critiques of Marine Protected Areas

Conditions of a successful MPA include (Rossiter & Levine, 2014):

- Increase in biodiversity, ecological conditions, or the species targeted for conservation;
- Compliance with MPA rules through social or legal pressure;
- Satisfaction amongst local community members and actor groups; and
- No significant net loss of actor wellbeing.

In theory, successful MPAs require a multitude of conditions, including effective communication of boundaries, outreach, co-management (Chap 8.1.3), incorporation of actor values, trust, knowledge integration, and mechanisms for conflict resolution (Bennett & Dearden, 2014).

However, in reality, the enforcement of MPAs often requires fishers to adapt by limiting extraction, changing fishing gear, and/or fishing in other areas (Rees et al., 2013). For small-scale fishers, these options can be untenable, as many fishers often lack the resources to make these changes (Chap 6.1.2). Bennett and Dearden (2014) noted that MPAs "[undermine] access to or [lack] support for development of cultural, social, political, financial, natural, human, physical, and political capital assets" (p. 107). Hence, on a social level, MPAs influence relational wellbeing (Chap 6.2) (e.g., effectiveness of fisher institutions [Chap 6.2.2]) and subjective wellbeing (Chap 6.3) (e.g., construction of self-identity [Chap 6.3.1]) (Rees et al., 2013; Weeratunge et al., 2014).

Communities, organizations and local institutions play an influential role in marine conservation success (Abecasis et al., 2013; Ban et al., 2011; Chakalall et al., 1998; Christie et al., 2002; Christie & White, 2007; Jameson et al., 2002). MPAs can be tools of empowerment if communities are given meaningful opportunities to participate in decision-making (e.g., in determining management objectives [Chap 8.2.2]) (Jentoft, 2005; Pollnac et al., 2001). Conversely, exclusively top-down governance processes can hinder community compliance (Bennett & Dearden, 2014), which is impacted by (Kaplan et al., 2015):

- Individual perceptions (i.e., of ecological rationale, legitimacy of regulation, legitimacy of authorities, moral obligation, fair treatment and respect from authorities, perceived fairness in cost/benefit distribution);
- Regulatory enforcement factors; and
- Incentives (i.e., participatory, economic, interpretative, knowledge-based).

As I outline next, a better understanding of ecosystem services and social wellbeing can offer pathways to transform governance processes from challenges into opportunities—for example: 1) access to certain ES may create incentives to conserve; 2) subjective wellbeing may provide new insights on individual perceptions; and 3) relational wellbeing may offer reflection of social norms that impact regulatory enforcement factors.

## 2.2 Ecosystem Services

Ecosystem services (ES) were first conceptualized by Wilson and Matthews in 1970, who referred to these benefits from the global environment as "environmental services" (Lele et al., 2013). The popularity of the ES concept climbed in 1997, when the global economic value of ES was published at an estimated 1994US$33 trillion/year (Costanza et al., 1997, 2014). ES literature became increasingly mainstream with the Millennium Ecosystem Assessment (MA, 2005), a synthesis report on a multi-scale assessment of how ecosystem change affects human wellbeing (Fisher et al., 2009; Gómez-Baggethun et al., 2010; MA, 2005). The MA (2005) posed four categories of ecosystem services, now widely recognized in ES scholarship (e.g., Fisher et al., 2009; Luisetti et al., 2011): provisioning (e.g., food, fresh water, fuel), regulating (e.g., climate regulation, flood regulation), supporting (e.g., photosynthesis, water cycling), and cultural (e.g., aesthetic, spiritual, recreational) (Figure 2.2). Since the MA (2005), policy makers have attempted to mobilize ES research in policy decisions (e.g., the Inter-governmental Platform on Biodiversity and Ecosystem Services [IPBES], the Economics of Ecosystems and Biodiversity [TEEB], Payments for Ecosystem Services [PES]) (Demissew et al., 2015; Farley & Costanza, 2010; Gómez-Baggethun et al., 2010; Lele et al., 2013; TEEB, 2009).
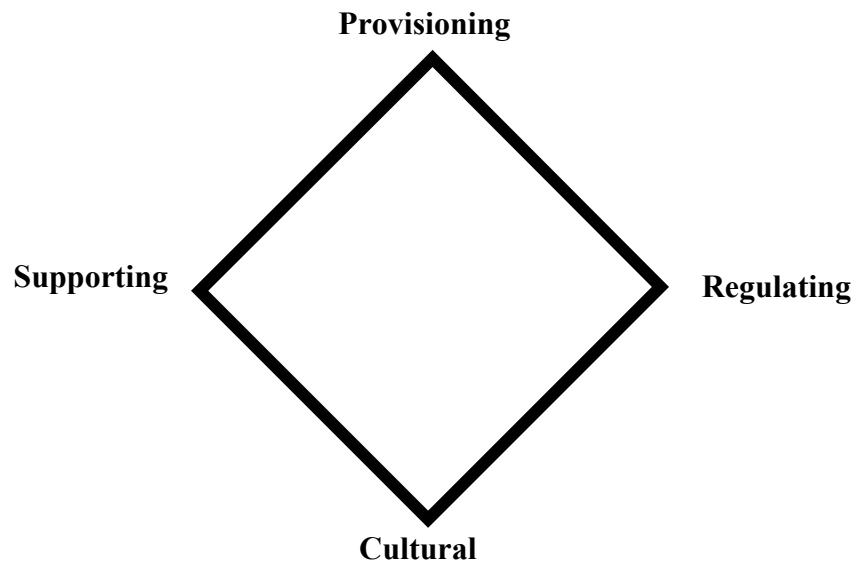


**Figure 2.2 Visualization of the four dimensions of ES.**

15

In this thesis, I offer a bottom-up examination of ecosystem services (Chapter 6). This qualitative, community-oriented perspective could complement existing market valuations of ecosystem services to better inform ES prioritizations in policy decisions. In the following sub-sections, I examine coastal-marine ecosystem services (Sec 2.2.1), which are contextually relevant to this case study about marine protected areas and small-scale fisheries. Then, I review broader critiques of the ecosystem service concept (Sec 2.2.2).

### 2.2.1 Coastal-Marine ES Indicators

Coastal-marine ecosystems provide a unique set of benefits to communities. Economically significant ES include climate regulation, raw materials, recreation, coastal protection (e.g., one case study at US$174/ha/year, not counting inflation), fisheries maintenance (e.g., one case study at US$15-45,000/km$^2$/year, not counting inflation), erosion control, and contaminant and nutrient cycling (Barbier et al., 2011; Luisetti et al., 2014). Some authors believe that Costanza et al. (1997)—who initially valued coastal-marine ES at approximately 1994US$21 trillion/year— undervalued these ES by US$62.3 trillion (Pendleton et al., 2016). The hypothetical value of coral reefs, in particular, is estimated at 67 times more than that of tropical rainforests (Pendleton et al., 2016). Over a decade later, Costanza et al. (2014) revisited their seminal 1997 paper, and estimated that the value of coastal-marine ES had dropped by a staggering 2007US$11 trillion between 1997 and 2011. Pendleton et al. (2016) calculated an even larger decline, and suggested that the value of coastal-marine ES accounted for a global decline in ES of US$19.1 trillion— roughly 95% of the estimated change in value of global ES. This decline in coastal-marine ES has been attributed to ocean habitat loss and degradation (Pendleton et al., 2016). Consequently, coastal-marine ES have been used in policy advocacy (Luisetti et al., 2011), like the implementation of marine protected areas to protect and optimize ES values (Potts et al., 2014). In this research, I examine community perceptions of ES decline in a SSF context (Chapter 5). Then, I discuss perceptions of MPA effectiveness for optimizing coastal-marine ES, and access to these services (Chapter 7). Table 2.1 summarizes indicators for each category of coastal-marine ES, followed by examples of each indicator. These indicators were used as predefined themes in data analysis (Chap 4.5.1).

**Table 2.2 Coastal-marine ES indicators (adapted from Böhnke-Henrichs et al., 2013, pp. 139–140; Liquete et al., 2013, pp. 6–7).**

| Category | Indicators | Examples |
|---|---|---|
| Provisioning | Food provision | Fish, shell fish, crabs, seaweed |
| | Sea water | Desalinization for consumption, washing, bathing |
| | Other raw materials | Algae (non-food), sand, salt, medicine |
| | Ornamental | Shells, aquarium fish, pearls, coral for personal consumption (e.g., decoration, fashion), or to be sold (e.g., handicrafts, souvenirs) |
| Regulating | Air purification | Removal of pollutants by vegetation, absorption through water |
| | Climate regulation | Production, consumption and use by marine organisms of gases (e.g., GHG), |
| | Disturbance moderation and weather regulation | Reduction in intensity of storms, influence of coastal vegetation and wetlands on air moisture |
| | Waste treatment | Breakdown of chemical pollutants by microorganisms, filtering of water by shell fish |
| | Coastal erosion prevention | Maintenance of coastal dunes, reduction in wave intensity, storms, sea level rise |
| | Biological control | Existence of fish to keep algae populations in check, limiting of undesirable species (e.g., jellyfish by turtles) |
| Supporting | Lifecycle maintenance | Supporting the regeneration and reproduction of commercially important species |
| | Gene pool protection | Intra- and interspecies diversity that supports ecological resilience of marine ecosystems |
| Cultural | Ethnobotany | Plant and animal species that are harvested for cultural consumption (e.g., for specific holidays, traditional medicine, religious ceremonies) |
| | Recreation and leisure | Bird/marine mammal watching, beachcombing, sailing, recreational fishing, scuba diving, snorkeling, swimming |
| | Symbolic and aesthetic values | "Sea-scapes" (e.g., clear blue water) and "reef-scapes" (e.g., colourful reefs, with colourful marine life), "beach-scapes" (e.g., pure sand with no litter, washed up dead coral, etc.) |
| | Inspiration for culture, art, design | Using marine-scape as inspiration for paintings, jewelry, architecture, design, films, poetry, etc. |
| | Spiritual experience | Worship of certain marine wildlife, spiritually significant places of worship, |
| | Information development | Environmental education, engineered biomimicry (e.g., imitating marine wildlife in propeller design) |
| | Cultural heritage and identity | UNESCO World Heritage sites, locations with cultural legacy, community gathering spots, traditional places |

## 2.2.2 Critiques of Ecosystem Services

The growing application of the ecosystem services concept and framework has led to a number of critiques (Chan, Satterfield, et al., 2012; Dempsey & Robertson, 2012; Gómez-Baggethun et al., 2010; Lele et al., 2013; Schröter et al., 2014). For example, criticisms of ES are that they can be highly economy-oriented, since the analysis of ES often places an overt emphasis on rational behaviour, tangible benefits, and monetary valuations (Lele et al., 2013; Schröter et al., 2014). In relation to the three declared pillars of sustainable development (i.e., environmental protection, economic growth, social equality) (WCED, 1987), some suggest that "public decisions about environmental problems are qualitatively different from choices made by individualistic consumers about commodities, precisely because environmental goods have the characteristics of common-pool goods or merit goods." (Lele et al., 2013, p. 351). Therefore, the economic focus of ES can contradict the "common" good in environmental and social dimensions, resulting in barriers to environmental protection and social equality. Furthermore, many ES may lack tangible economic value, despite known sociocultural value.

Existing ES frameworks tend to undervalue intangible services which offer no immediate material benefit (Chan, Guerry, et al., 2012; Chan, Satterfield, et al., 2012; Daniel, Muhar, Aznar, et al., 2012). In other words, a majority of existing ES valuation methods are inappropriate for context-specific cultural ecosystem services (CES), and may lead to an underrepresentation of cultural values in planning and policy (Klain et al., 2014). These narrowly scoped valuations can exacerbate social inequality, thereby enhancing conflicts between state, private, and local institutions. Hence, the inclusion of community values and CES in decision making may reduce conflict and improve acceptability of top-down decisions (Klain et al., 2014; Poe et al., 2014; Turner et al., 2008). In this regard, the social wellbeing framework (introduced in the following section) contributes an opportunity to better evaluate intangible benefits by offering consideration of the non-material dimensions of wellbeing (i.e., relational and subjective dimensions).

Wieland et al. (2016) further make the distinction between ES as benefits versus ES as realized benefits, criticizing the assumption that supply of ES equates to a trickle-down effect of benefits for actors, as access to these benefits may "[vary] across space, groups, or communities"

18

(p. 176) (evidenced in Chapter 7). For example, an increase in fish stocks will not translate to an increase in food provisions if fishers are unable to access spillover effects (i.e., fish leaving the protected area for other habitats). There are temporal, spatial, and social barriers that prevent access—particularly for disadvantaged and marginalized populations (Chap 7.3.1). These barriers might include (but are not limited to) geographic location, technical capacity, markets and user conflict, and management (Martín-López et al., 2009; Wieland et al., 2016). Ribot and Peluso (2009) have referred to access as "the ability to derive benefits from things" or "all possible means by which a person is able to benefit from things". The concept of ES oversimplifies or, arguably, overlooks the institutions and norms surrounding natural resource management and property rights. In this argument, property is "the right to benefit from things" or a "socially acknowledged and supported" claim (p. 153, 156). By this notion, the availability of benefits does not imply "the right to benefit"—highlighting the distinction between the word "benefit" as both a noun and a verb. Social wellbeing (Sec 2.3) addresses these critiques of ES, since material wellbeing is a determinant of spatial-temporal access (e.g., gas, boats for fishers) (Chap 6.1), and relational wellbeing is germane to access rights, user conflicts, and social groups (e.g., relationships regulating the informal norms of resource use) (Chap 6.2).

Another identified critique of ES is the misplaced assumption of high ES elasticity, described as the strong coupling between wellbeing and ecosystem quality. The argument, here, is that individuals benefit when ecosystem quality improves and suffer when ecosystem quality declines (Daw et al., 2016). In practice, however, the relationship between ES and wellbeing exists on a sliding scale of elasticity, where low elasticity means that ecosystem quality has only minor impacts on wellbeing, and negative elasticity refers to the paradox where wellbeing increases as ecosystem quality declines (Daw et al., 2016). This case study of the BBSFCA will highlight a manifestation of this ES elasticity.

## 2.3 Social Wellbeing

The emergence of wellbeing-focused initiatives has increased steadily across government, NGO, and academic sectors in past decades (e.g., NEF, 2012) (Barrington-Leigh & Escande, 2016). A particularly sharp rise of interest in wellbeing occurred during the mid-2000s (Barrington-Leigh

& Escande, 2016), coinciding with the publication of the MA (2005).  As noted by White (2009b), in the years preceding 2009, there was a "steady build up of interest in wellbeing within international development" (p. 2).  The MA (2005) specifically examined human wellbeing, constituted by: basic material for a good life, health, good social relations, security, and freedom of choice and action.  Social wellbeing has emerged as a distinct interpretation of wellbeing, summarized by three dimensions: material (e.g., resources, income, assets), relational (e.g., access to markets, institutions, social capital), and subjective (e.g., self-identity, aspirations, happiness) (Figure 2.3) (White, 2009a, 2009b).  As such, social wellbeing is also referred to as three-dimensional wellbeing (e.g., Coulthard, 2012).  Relational wellbeing includes social relations, access to public goods, personal relationships, and attitudes in life.  Subjective wellbeing entails individual perceptions (of material, social, and human position) and cultural values (including ideologies and beliefs) (White, 2009a).  Subjective wellbeing may be the most intangible of all three dimensions, and there are conflicting views about its meaning.

**Material**

**Subjective**                                                                      **Relational**
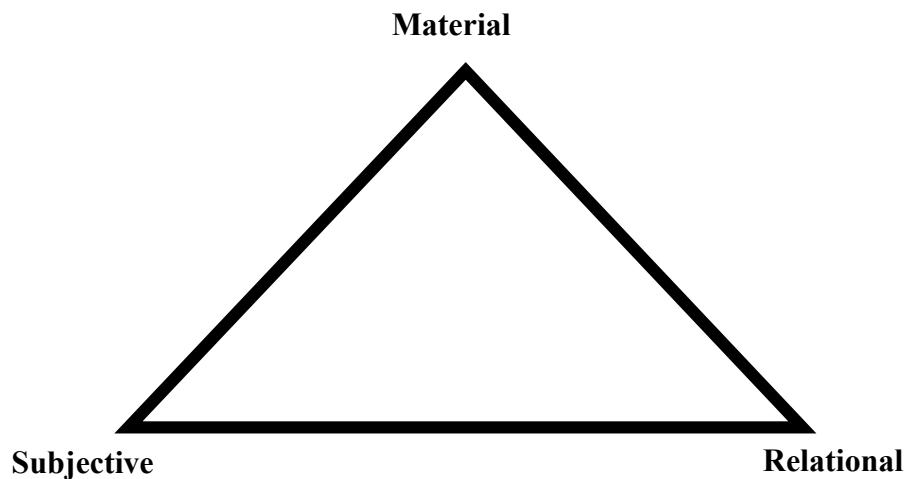
**Figure 2.3 Visualization of the three dimensions of social wellbeing.**

**\*(adapted from White, 2009b)**

Angner (2010) posited that there is great uncertainty in the definition and role of subjective wellbeing across disciplines.  He argued that wellbeing, as a whole, might be a measure of perception and relativity.  The perception-based nature of wellbeing is referred to as

the wellbeing simpliciter (Angner, 2010). For example, sometimes living well on your own terms does not equate to living right in the eyes of others (e.g., doing the right thing, being morally good). In this wellbeing formula, subjective wellbeing may constitute the entirety of wellbeing, or act as a component of it (Angner, 2010) (e.g., as is the case in SW). The multiple definitions of subjective wellbeing entail a cognitive, hedonic (i.e., sense of pleasure and pain), emotional, or mood state through which we perceive happiness or satisfaction (Angner, 2010). By the classic definition of social wellbeing— "a state of being with others, where human needs are met, where one can act meaningfully to pursue one's goals and where one enjoys a satisfactory quality of life" (McGregor, 2008)—quality of life should be a subjective measure of how one experiences life, rather than an objective measure of an external observer (Angner, 2010). In this discourse, subjective wellbeing plays a crucial or defining role in the perception of the material and relational dimensions of SW.

Social wellbeing has been recognized under some of its present meanings since as early as 1975, when Merlin Hackbert debated the effectiveness of "social well-being assessment" in his critique of an American federal resource development project (p. 56). Hackbert (1975) characterized this concept as the "for whom" factor in policy making. He highlighted the importance of recognizing identity, community, and context-specific values in decision-making. From a modern perspective, proponents of SW suggest that this concept transpired to challenge the overemphasis of economic valuation in policy decisions (Deneulin & McGregor, 2010), thus complementing existing critiques of ES (e.g., focus on monetary valuation, lacking emphasis on context, community, and intangible value). The social wellbeing framework has also been cited as a critical response and advancement of the "capability approach" or "livelihood approach" to wellbeing, which was itself a critique of economy-oriented objective wellbeing (Weeratunge et al., 2014).

Discussed by Deneulin and McGregor (2010), the capability approach first gained prominence in 1990, when the United Nations Development Programme (UNDP) investigated this approach in the Human Development Report. Central arguments to this approach are: 1) quality of life should be the central focus of policy; 2) "human freedom and the ability to make decisions…[are] central to human dignity"; and 3) ethics should be at the heart of policy-making

21

(Deneulin & McGregor, 2010, p. 3).  However, like the wellbeing simpliciter concept, the capability approach recognizes that standard of living is not defined solely by the material world. The capability approach is criticized for viewing human freedom in an overly individualistic way (Deneulin & McGregor, 2010).  Subsequently, a "social conception of human wellbeing" was formed to synthesize objective (i.e., observable circumstance) and subjective wellbeing (i.e., individual perception) (White, 2009b), and to incorporate both individual and collective social dimensions (Deneulin & McGregor, 2010).  In a social conception of wellbeing, wellbeing becomes a dynamic process and relationship, rather than a static state that falls under individual ownership (White, 2009a).  In this sense, adjusting wellbeing also involves transforming interpersonal engagement (White, 2009a).

White (2009b) outlined that social wellbeing can be organized under three domains: economic (i.e., material), psychological (i.e., subjective), and sociopolitical (i.e., relational).  The social wellbeing concept emerged from social science and international development scholarship (see Blackmore, 2009; Camfield et al., 2009; CIW, 2012; Sarracino, 2010; White, 2009a; Wills-Herrera et al., 2011), and as a result, there are still many opportunities for SW application in environmental studies (e.g., Britton & Coulthard, 2013; Coulthard, 2012; Daw et al., 2011; Porter, 2012).  In the context of coastal-marine systems, many have attempted to fill this SW gap in the literature (e.g., Abunge et al., 2013; Britton & Coulthard, 2013; Coulthard, 2012; Coulthard et al., 2011; D'Anna & Murray, 2015; Hossain et al., 2015; Porter, 2012; Trimble & Johnson, 2013; Weeratunge et al., 2014).  Regarding fisheries, Coulthard (2012) suggests that the social wellbeing lens may offer a metric for in-depth social impact assessments.  By further recognizing social wellbeing as a process, there are opportunities to explore how "the pursuit of wellbeing goals influences fisher behaviour" (White, 2009a).  Accordingly, social wellbeing can act as a bridge between sustainability and socioeconomic development by shedding light on how fishers relate to their environment.  In doing so, governance and policy decisions may be improved by incorporating motivations for positive behavioural change (Coulthard et al., 2011). This research aims to contribute to this growing body of literature on small-scale fisheries, governance, and social wellbeing.

### 2.3.1 Social Wellbeing Indicators

Social wellbeing is an emerging field with a great deal of linguistic uncertainty. The literature reflects a general usage of social wellbeing as a blanket term for good social relations, a category of human well-being (MA, 2005), and social welfare (see Abunge et al., 2013; England, 1998; Porter, 2012). For the scope of this research, relevant indicators of social wellbeing, as conceptualized by White (2009a), are noted in Table 2.3. These indicators provided a deductive foundation for data analysis (Chap 4.5.1), and were chosen for their relevance to small-scale fishing communities as determined by existing literature (Weeratunge et al., 2014).

**Table 2.3 Social wellbeing indicators and examples (adapted from Armitage et al., 2012; Britton & Coulthard, 2013; Weeratunge et al., 2014; White, 2009a).**

| Dimension | Indicators | Examples |
|---|---|---|
| Material | Raw material resources | Access to provisioning ecosystem services, species and natural materials targeted for fishing or collection |
| | Other material resources | Access to ports and fishing gear; income, assets, level of consumption, housing quality; availability of water, food, sanitation, electricity, credit, and shops |
| | Social resources | Newspapers, internet, telephone |
| | Human resources | Age, life experience, formal and informal education, marital status, job and tenure status, health |
| Relational | Organizational Belonging | Social, political, cultural affiliations (e.g., political party, sports club, church group); fisher groups (e.g., co-ops, networks); perceived position in household, community, regional and national institutions, global markets and international institutions |
| | Societal infrastructure | Laws and policy, political autonomy, employment and livelihood opportunities; access to public goods, schools, colleges, clinics, hospitals, sports centers, play areas, places of worship |
| | Social capital | Support networks, personal relationships, strength and diversity of social ties, equity, leadership, love and care |
| Subjective | Identity | Social, political, cultural identity (e.g., ideologies influenced by caste, gender, religion, race, ethnicity, age, disability) |
| | Perceived quality of life | Aspiration gap (i.e., people's interpretation of whether they have achieved their goals), beliefs, values (e.g., things people need to have, need to able to do, or need to be), norms, satisfaction (i.e., gap between ideal and actual reality), hopes, fears |

## 2.3.2 Critiques of Social Wellbeing

There are multiple critiques of the social wellbeing concept, including: 1) inconsistency in measurement and subsequent lack of comparability; 2) "preoccupation with affluence" (akin to criticisms of ES); 3) impractical applications in policy and politics (complemented by ES); 4) overemphasis on individualism; and 5) that the literal meaning of the term "well"-being denotes a misleadingly individualized and positive perspective, thereby possibly ignoring the negative aspects of life (i.e., "ill"-being) (White, 2009a).

First, certain aspects of wellbeing are challenging to measure accurately (i.e., internal validity) and repeatedly (i.e., reproducibility). For example, the day's mood may dictate responses relating to life satisfaction. Further, the concept of wellbeing can be highly contextual (e.g., demography, culture, country), making the results of wellbeing research difficult to generalize and apply across contexts (i.e., external validity) (Krueger & Stone, 2014) (see Chap 4.7). As well, some argue that even if possible, the aggregation of wellbeing data would detract from its value as a qualitative social indicator (Barrington-Leigh & Escande, 2016). Second, some suggest that the idea of subjective and relational wellbeing is a luxury for those who have already secured material wellbeing, which may render this framework irrelevant in developing countries (White, 2009a). Third, a wellbeing policy focus raises concern over the potential withdrawal of state-sponsored material aid in lieu of redirection towards non-material support systems (e.g., counseling)—both material and non-material support is required. Fourth, authors argue that wellbeing endorses individualism since the subjective dimension is cited as an apex (Angner, 2010; White, 2009a). This individualistic orientation suggests emphasis on Western ideology, shouldering negative connotations (Christopher, 1999 as cited in White, 2009a). Finally, social wellbeing must recognize "ill-being" and resist individual ego-centered self-interests to better recognize systemic social inequalities (White, 2009a). In the following section, I introduce the conceptual framework for this research and discuss complementary elements of ES and SW—a complementarity that may assist in reconciling the weaknesses of each framework.

## 2.4 Conceptual Framework

In this section I explain, justify, and discuss the conceptual framework guiding my project. I also describe the theoretical rationale and construction of the framework as an initial process in research development. The application of this framework to this research occurs in Chapter 7.

### 2.4.1 Theoretical Rationale Linking ES and SW

The review of ecosystem services, social wellbeing, and governance of MPAs substantiates the need for involvement of small-scale fishing communities in planning and policy. Nonetheless, conceptual gaps at the intersection of ecosystem services and social wellbeing require theoretical clarification. While ES have been widely studied for the past two decades (e.g., Costanza et al., 1997; Gómez-Baggethun et al., 2010; Lele et al., 2013; Polasky & Segerson, 2009), research on social wellbeing, particularly in small-scale fisheries, is an emerging body of literature (Weeratunge et al., 2014). The advantages of a social wellbeing approach is that it draws attention to equity and empowerment by examining the multiple paths through which individuals realize fulfillment in life, in contrast to traditional frameworks (e.g., sustainable livelihoods) that measure material wealth and socioeconomic vulnerability (Weeratunge et al., 2014).

However, further inquiry is needed to effectively mobilize the findings of wellbeing research (Coulthard et al., 2011). The coupling of ES and SW could lead to advances in the governance of MPAs by: 1) clarifying the material and non-material drivers of action in small-scale fishing communities via the social wellbeing framework, using the ecosystem services framework to articulate specific ecological and cultural drivers; 2) identifying the drivers of conservation with the greatest influence on SSF and community livelihood, which is the basis for successful resource management strategies; and 3) providing insight on how these drivers may be applied in future planning, decision-making, and policy in a small-scale fisheries context. This research aims to identify the ecosystem services and social wellbeing linkages at the heart of this conceptual framework, where ES-SW linkages represent drivers of action.

### 2.4.2 Conceptual Framework

A visual synthesis of ES and SW frameworks is depicted in Figure 2.4. The upper-most triangle, Section 1, represents the objective ecological dimension of a social-ecological system (SES).

This portion illustrates the provisioning (e.g., fish), supporting (e.g., biodiversity), and regulating services (e.g., climate regulation) that form the biophysical foundation for material wellbeing. The social dimension of an SES is represented by the bottom half of the triangle, Section 2, where individuals (i.e., subjective wellbeing), groups, and communities (i.e., relational wellbeing) form the foundation. Cultural ES (e.g., recreational value, spiritual inspiration, positive inspiration, educational value) (Daniel, Muhar, Arnberger, et al., 2012; Milcu et al., 2013) are central to the constructs of individual identities (i.e., subjective wellbeing) and social relations (i.e., relational wellbeing) (Tengberg et al., 2012)—these ES are intangible benefits coloured by social, cultural, and political identity. Still, as symbolized by the overlap of these two sections, social institutions underpin our interactions with ecological systems (Biermann et al., 2010; Deneulin & McGregor, 2010; Jentoft et al., 1998). Fittingly, our view of the social dimension is obscured beneath the tangible, biophysical world. Natural resources (i.e., ecological dimension) are at the forefront of many environmental decisions, even though the social institutions surrounding natural resource management play a critical role in identifying opportunities and challenges for conservation (Berkes, 2005a; Cox et al., 2010; Jentoft, 2004). These social-ecological interactions are complex and, thus, opaque in this conceptual framework.
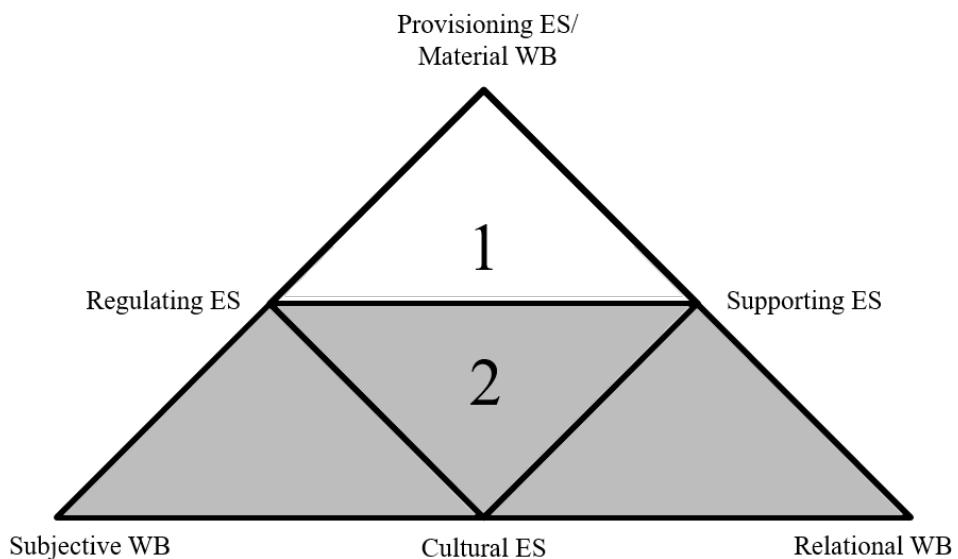


**Figure 2.4 Thesis conceptual framework: a synthesis of ES and SW.**

**\*The white area is Section 1, the shaded area is Section 2**

26

The orientation of each component in the framework symbolizes the social-ecological positioning of the Anthropocene, where humans play a foundational role in shaping ecological systems (Biermann et al., 2012; Rockström, 2009). The existence of linkages between humans and nature is evident, but specific opportunities and challenges of these linkages to inform governance and decision-making are complex and continuously being investigated (e.g., Armitage et al., 2009; Folke et al., 2005; Leenhardt et al., 2015). Known linkages between ES and social wellbeing support that a loss of material wellbeing exacerbates social and political conflicts, possibly undermining social wellbeing by disrupting social ties (Nayak et al., 2014). Therefore, this relationship is bi-directional—just as humans can impact ecosystems, the effects of the material environment (Section 1) can trickle down to affect identity (i.e., subjective wellbeing) and relationships (i.e., relational wellbeing) (Chapter 7). A weakened community foundation and a lack of social capital (Section 2) perpetuates ecological degradation through the failure of local institutions to regulate resource access (Ostrom, 1990b). This thesis aims to enhance the transparency of social-ecological interactions surrounding coastal-marine natural resource use and marine protected areas by utilizing ecosystem services and social wellbeing as lenses to further examine these relationships. Linkages between this conceptual framework and research objectives (Box 2.1) are summarized in Table 2.4.

**Box 2.1 Review of research objectives.**

1) Identify the ecosystem service bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);
2) Define how a marine protected area (MPA) has changed access to these bundles for each group;
3) Examine how changes in access to these bundles have affected social wellbeing (i.e., material, subjective, and relational wellbeing); and
4) Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).

27

**Table 2.4 Linkages between research objectives and conceptual framework.**

| Objective | Framework | ES-SW Connections |
|---|---|---|
| 1 | Section 1 | Ecological bundles concern the provisioning, regulating, and supporting services of an ecosystem. Provisioning services are direct, tangible, and material benefits, where regulating and supporting services support the production of these benefits. |
|  | Section 2 | Regulating and supporting services may likewise support the availability of sociocultural bundles (i.e., cultural services), which could be tangible (e.g., places of worship, ethnobotany, raw materials in cultural artefacts), and intangible (e.g., spiritual inspiration, recreation, aesthetic enjoyment, educational value). |
| 3 | Section 1&2 | In a resource-based community, material wellbeing at an individual level can be distilled to resource access, which promotes the increase of financial and material assets (White, 2009a). As such, material wellbeing is directly tied to the availability of natural resources (e.g., fish) (Section 1). However, social relations also determine degrees of material wellbeing (e.g., policy, social capital, institutions) (Section 2).<br>    A lack of access to ES (material and non-material bundles) may contribute to a decline in all aspects of wellbeing. For example, a failed fisher may experience identity loss (i.e., subjective wellbeing) and a strain on relationships with those who rely on them for natural and financial capital, such as their immediate family, or business partners (i.e., relational wellbeing) (Sections 1 & 2). |
| 2, 4 |  | MPAs alter access to ES and wellbeing, but the "how" remains unclear (e.g., which ES, which dimensions of wellbeing, to what extent). Answering the "how" may inform governance practices for failing MPAs. The complex linkages and convergences between the ecological (Section 1) and social (Section 2) systems may offer insights into why some conservation efforts fail. For example, a no-take MPA may not succeed in its ecological goals if it is immensely detrimental to community wellbeing, or if there are no robust social institutions to manage it (e.g., to monitor and enforce its rules). |

## 2.5 Chapter Conclusion

In this chapter, I shared a literature review of key concepts relevant to the research objectives of this thesis: 1) the governance of marine protected areas (Sec 2.1); 2) ecosystem services (Sec 2.2); and 3) social wellbeing (Sec 2.3). I concluded this chapter by introducing the conceptual framework of this research, which synthesizes these key concepts (Sec 2.4). Coastal communities are facing numerous challenges, including climate change, coastal development, and the overexploitation of natural resources. In response to these challenges, marine protected

areas are being touted as a conservation strategy to preserve and protect coastal-marine resources.  However, a major challenge to the governance of MPAs is the nature of coastal-marine resources, which can be both migratory and dynamic.  Further, governance processes for MPAs often neglect the involvement of communities, thereby negatively impacting many small-scale fishing communities.  A failure to be inclusive in MPA planning and policy may ultimately lead to low compliance and legitimacy, since community members are unable to access the coastal-marine benefits that serve as the determiners of their wellbeing.  In this research, I endeavour to identify linkages between ecosystem services (i.e., the benefits people obtain from ecosystems) and social wellbeing (i.e., the material, relational and subjective dimensions of wellbeing) (Chapter 7), and apply these ES-SW linkages to better understand how MPA governance can support small-scale fishing communities (Chapter 8).  In the following chapter, I introduce the case study context (Bluefields, Jamaica) in greater detail.  Then, I discuss governance challenges that are specific to this case study.

# Chapter 3
# Case Study Context: Bluefields, Jamaica

In this chapter, I present the case study for this research: Bluefields, Jamaica. I expand on the case study context provided in Chapter 1.3. I begin by defining small-scale fisheries and the interpretations of "community", before summarizing the national and local challenges of MPA governance in the small-scale fishing community of Bluefields. The MPA in question is the Bluefields Bay Special Fishery Conservation Area (BBSFCA), a no-take zone (Figure 3.1).
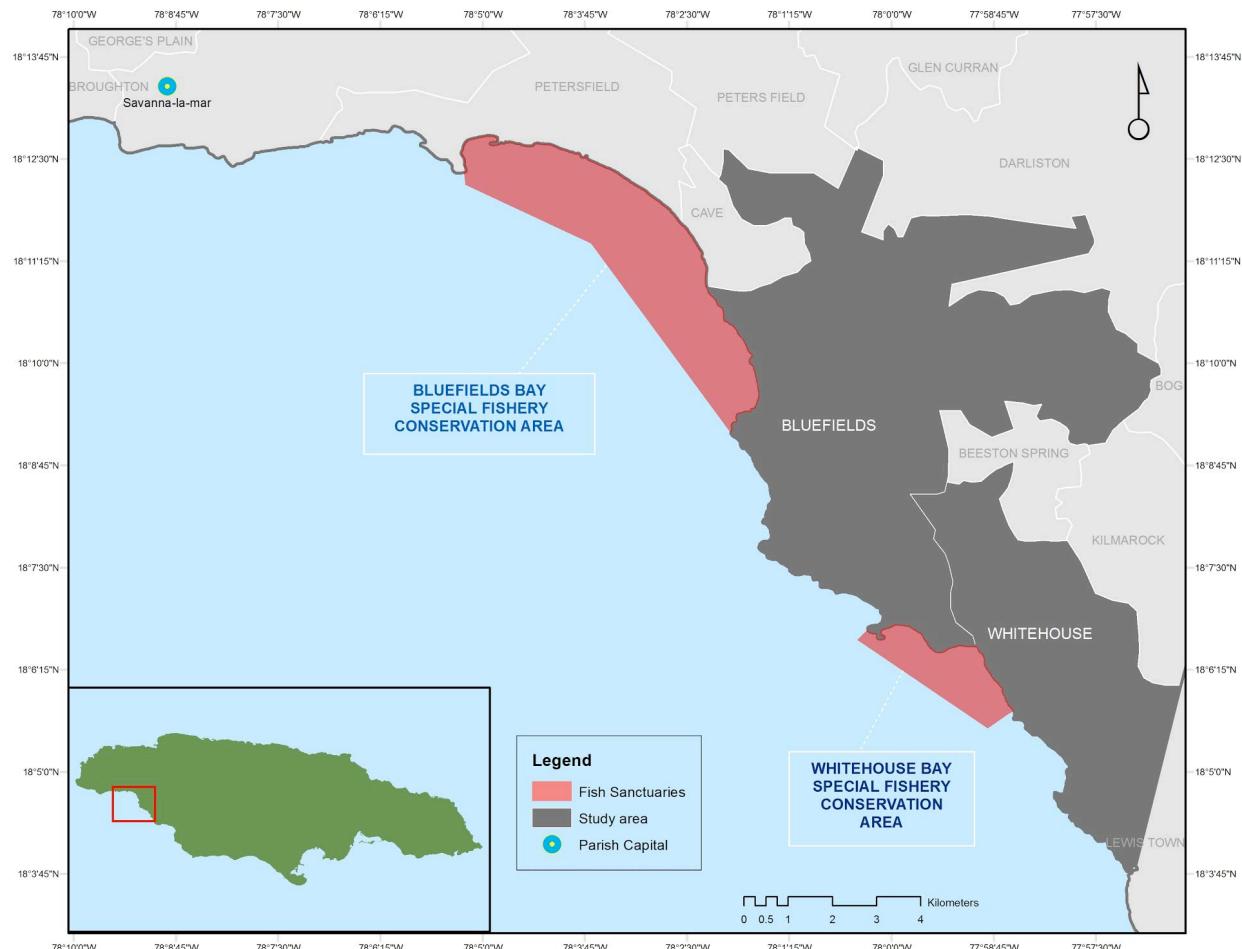


**Figure 3.1 Map of the Bluefields Bay Special Fishery Conservation Area (Campbell, 2014).**

## 3.1 Small-Scale Fishing Communities

The FAO (2015a) defines small-scale fisheries (SSF) as

> traditional fisheries involving fishing households (as opposed to
> commercial companies), using relatively small amount of capital and
> energy, relatively small fishing vessels (if any), making short fishing trips,
> close to shore, mainly for local consumption. In practice, definition varies
> between countries, e.g. from gleaning or a one-man canoe in poor
> developing countries, to more than [20 m] trawlers, seiners, or long-liners
> in developed ones. Artisanal fisheries can be subsistence or commercial
> fisheries, providing for local consumption or export. They are sometimes
> referred to as small-scale fisheries.

The implications of the term "relative" is context-specific, and assesses two components: 1) scale measured by vessel size; and 2) technological complexity measured by capital investment in boats and equipment per fisher (i.e., "artisanality") (FAO, 2015a). This definition further demonstrates the linguistic uncertainty in artisanal fisheries versus small-scale fisheries. Many consider artisanal fisheries a type of SSF, whereas the FAO suggests that the term "artisanal" is associated with French and Spanish-speaking areas, while the term "small-scale fisheries" is prominently used by Anglophones (FAO, 2015a; Schorr, 2005). The FAO uses these two terms interchangeably (FAO, 2015a). There are numerous obstacles and debates over the definition of artisanal fishing (Schorr, 2005). However, the United Nations Environment Programme (UNEP) defines artisanal fisheries as exhibiting the following traits: "small-scale; local (usually 'in-shore'), relatively poor, non-industrial, and 'low-tech'" (Schorr, 2005, p. 1). The scope of this research will concern SSF, while considering artisanal fisheries as a respective subset.

Small-scale fishing communities are vital to coastal-marine governance on a local scale, and SSF have long been recognized for their contributions to a sustainable future (Allison & Ellis, 2001). However, the definition of "small-scale fishing community" as a social-ecological unit masks a great deal of uncertainty. To begin, the definition of SSF has led to universal debate (Johnson, 2006). Drawn from previous definitions, SSF are defined by the following feature classes (Johnson, 2006, p. 750):

- Socio-economics (e.g., nature of fishing unit, nature of work, disposal, processing, ownership, investment, income level);

- Knowledge and technology (e.g., craft, gear, catch capacity);

- Management (e.g., fisheries authority, management units, rules, data collection); and

- Spatial-temporal scale (e.g., fishing bases, location, duration, seasonality).

As discussed, the relative scale of these features can be highly context-specific.

In Jamaica, 3100 out of 3119 fishery licenses are small-scale licenses (CARICOM, 2000). Small-scale fishers in Jamaica face "fear of taxation, poor beach facilities, pollution, larceny, little or no alternative means of employment and inability to access loans to purchase equipment" (CARICOM, 2000, p. 19) (Chap 6.1). The Ministry of Agriculture and Fisheries (MOAF) is responsible for managing fisheries-related issues on the island. This research will later highlight some challenges of top-down fisheries management (Chap 8.1.1). Landing sites (i.e., areas where fishers depart or arrive from fishing trips) are ubiquitous along the coast. The government officially recognizes at least 148 landing sites (CARICOM, 2000), although there are also a large number of unofficial bases. In Bluefields, fishers tend to be from a lower socioeconomic class and fish year-round, primarily with family members, using inexpensive and/or self-assembled gear (e.g., a spear gun, fish trap). Fish and seafood, once caught, are typically sold on the same day to friends, family, hotels, vendors, or markets. Certain low-value species (e.g., bonito) might be stored in a chest freezer and sold shortly after (Participant 21, personal communication, Nov 18, 2015). Catch capacity (i.e., the number of fish caught per day) is low in comparison to industrial fishing, particularly for inshore fishers. As such, fisheries in Bluefields are small-scale.

The definition of "community", like SSF, is equally diverse and context-specific. Communities are not static. Described by Berkes (2005a), communities are dynamic "multi-dimensional cross-scale social-political units" (p. 19). Agrawal and Gibson (1999) further expand on this definition by classifying communities into three categories: 1) community as a spatial unit; 2) community as a homogenous social structure; and 3) community as common interest and shared norms. Evidence supports the understanding of all three categories of community in Bluefields (Chap 6.2). Suffice to say, the term "small-scale fishing community" suggests a complexity of meanings, values, and conditions. Nevertheless, research conclusively supports that these communities—however they may be defined—face numerous issues relating

to poverty and food security (Beveridge et al., 2013; Hall et al., 2010; Nayak et al., 2014), and thus represent a challenge for marine conservation initiatives (e.g., MPAs) (FAO, 2015b). In Bluefields, perceptions of community are germane to conceptualizing social wellbeing and understanding governance processes.

## 3.2 Inshore Versus Offshore Fishing

In the context of Jamaican small-scale fisheries, inshore fishers are fishers who typically fish for coral reef finfish (e.g., parrotfish [Scaridae], snapper [*Lutjanus* spp.]), molluscs (Mollusca), and lobsters (*Panulirus argus*) with pots, nets, and/or spear guns in the coastal waters of Jamaica's island shelf (CARICOM, 2000). Coral reefs, where Jamaican inshore fisheries operate, are habitats experiencing severe decline all over the world (Pandolfi et al., 2003; Sadovy, 2005). Many inshore fisheries face issues relating to climate change, habitat degradation, and severe exploitation of fish stocks (Bijma, Pörtner, et al., 2013; Burke & Maidens, 2004; Hughes et al., 2003; Pandolfi et al., 2003). Therefore, inshore fishers are highly vulnerable. Spear fishers have especially low profit margins (Kronen, 2004) and, in this case study, have emerged as the most vulnerable to the impacts of the BBSFCA (more in Chap 7.3.1).

Offshore fishers, on the other hand, typically fish for coastal pelagic species (using trolling lines) and/or coral reef finfish, lobster, and conch (using pots) from Jamaica's offshore banks (e.g., Near Bank, Pedro Bank) and Southern Shelf. The Southern Shelf of the island is considerably larger than the Northern Shelf, extending up to a maximum of 24 km away from the coastline (Figure 3.2). Like inshore fishers, some offshore fishers also operate in coral reef habitats. In Bluefields, the primary distinguishing feature between inshore and offshore fishers is having access to a large fishing vessel (e.g., >10 m) with a capable engine. A sturdy boat with a powerful engine allows fishers to capitalize on offshore areas, where there is less competition from other fishers for resources. Since offshore fishers do not fish in the nearshore area, they have experienced far fewer impacts from the BBSFCA (more in Chap 7.3.2).

In later chapters, this thesis will analyze the governance issues across these two groups of fishers (Chapter 7). As fishers who fish in different habitats and for different species, the conservation priorities of inshore fishers and offshore fishers exhibit a notable divergence. This

divergence has been a source of conflict within the community (Sec 3.4.2) and hinders progress in governing the BBSFCA.
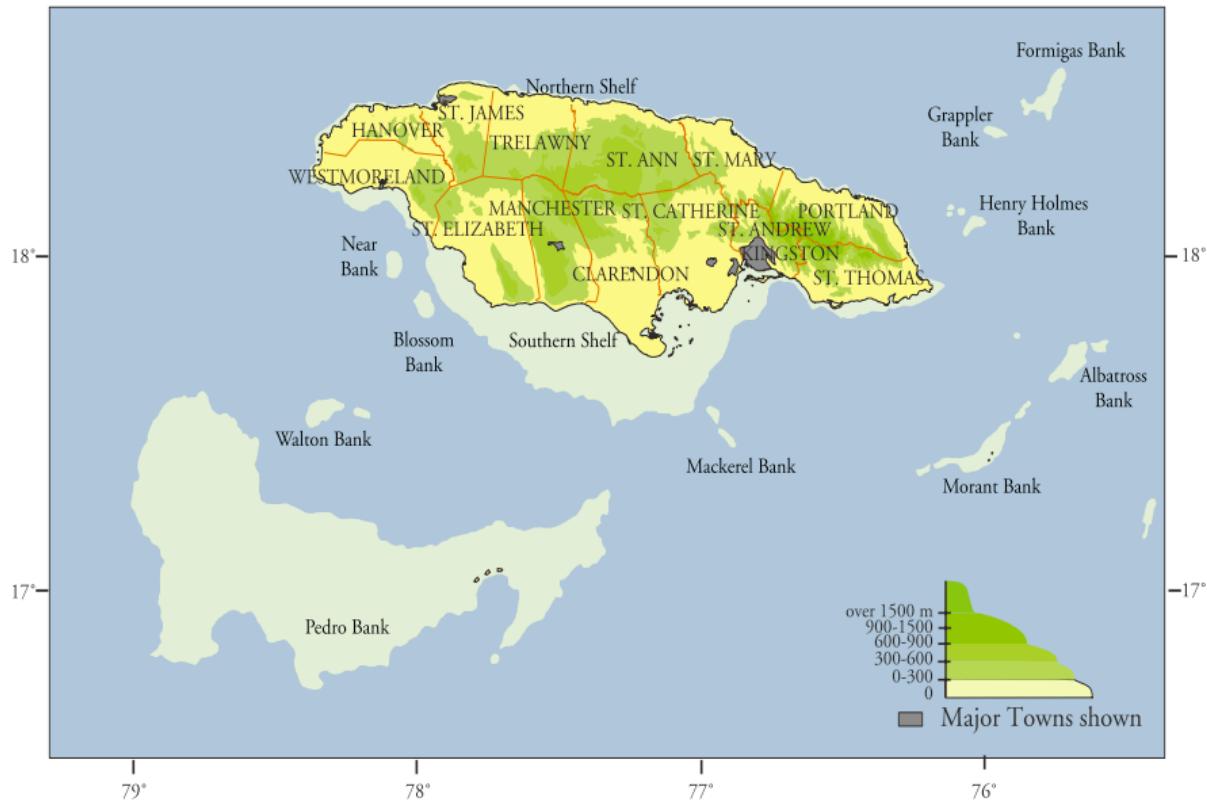


**Figure 3.2 Major banks of Jamaica (CARICOM, 2000, p. 20).**

## 3.3 Marine Protected Areas (MPAs) in Jamaica

In Jamaica, there are 19 types of protected areas (PAs), administered by five government agencies and three ministries.  This system of PAs was first introduced by National Environment & Planning Agency (NEPA) and the National Environmental Societies Trust in 1992 (NEPA, 2004).  The topic of international consistency was broached in the 1997 national PA policy, where there was pressure to re-categorize these 19 PA types under IUCN nomenclature (NEPA, 2004).  Jamaica's current PA network consists of the following IUCN classes: Class IV (8 PAs), Class V (1 PA), class VI (117 PAs), and 9 PAs that are unreported (UNEP, 2015) (Chap 2.1.1). This lack of international consistency is further complicated by redundancy between the five national government agencies through which these acts are administered.  In an ocean context,

however, "fish sanctuaries" are unanimously recognized as no-take zones.  Still, the distinction between "marine protected area" (used by the Beach Control Authority), "fish sanctuary," and "Special Fishery Conservation Area" (SFCA) (both used by the Fisheries Division) is ambiguous and often used interchangeably in discourse (MOAF, 2011; NEPA, 2004).  In Bluefields, community members refer to the BBSFCA colloquially as "the fish sanctuary" or "the sanctuary".

Per Jamaica's Ministry of Agriculture and Fisheries (MAOF), there are 12 listed SFCAs.  UNEP likewise acknowledges 15 coastal protected areas, including both MPAs and "marine parks"—marine parks are recognized by NEPA as protected areas spanning both terrestrial and marine environments (e.g., tide pools).  A further six MPAs and MPA expansions were proposed in Jamaica's National Ecological Gap Assessment in 2009 (EWG, 2009).  BBSFCA, the focal MPA of this case study, is considered a no-take Special Fishery Conservation Area (MOAF, 2011).  The specific IUCN class of this MPA is undefined, although it is likely Class IV (Chap 2.1.1) based on its purpose (to restore and conserve fish habitat) and its current non-use policy (e.g., lacking traditional resource management practices).  Initial national conservation plans aligned Jamaican protected area types with IUCN classifications (Government of Jamaica, 1997), although the existing system does not reflect these parallelisms.  Despite arguments that the Jamaican protected area system may be too "peculiar" for adoption of international classifications (e.g., there are no baseline pristine habitats, precluding human use is rarely an option), NEPA recognizes that formally adopting the IUCN system could facilitate international support and funding (NEPA, 2004, p. 9).  Hence, one declared goal of Jamaica's Protected Areas System's Master Plan (PASMP) for 2013-2017 was to "[r]eview and streamline existing protected area categories with international classifications represented by the [IUCN] Protected Area Management Categories" (PAC, 2012b, p. 67)—national progress on this goal is unknown, despite UNEP reporting its own classifications of some Jamaican MPAs (UNEP, 2015).

### 3.3.1 The Bluefields Bay Special Fishery Conservation Area

The BBSFCA was established in 2009.  At the time, the BBSFCA was Jamaica's largest MPA.  BBSFCA covers 12.3 km$^2$, 10.5 km of coastline, and multiple ecosystem types (e.g., mangroves,

seagrass beds, coral reef, artificial reef units) (C-FISH, 2015). Currently, there are no physical markers marking the boundary of the MPA, as wardens claim that the marker buoys were often vandalized (Participant 4, personal communication, Aug 18, 2015). As a no-take zone, the BBSFCA offers maximum *de jure* protection of coastal-marine ecosystems (IUCN, 2015a; NOAA, 2014). The Bluefields Bay Fishermen's Friendly Society (BBFFS), representing approximately 70 local fishers, currently manages the BBSFCA. Mentioned previously, an argument for the "peculiarity" of Jamaican protected areas is the unlikelihood of precluding human use. In Bluefields, while the BBSFCA is no longer fished, some sanctuary supporters argue that the sanctuary's aesthetic values could enhance tourism (Chap 5.2.5). Still, fishing remains a direct livelihood for roughly 400 fishers in Bluefields, and this figure does not include those who rely on the resource indirectly (e.g., vendors) (C-FISH, 2015). As such, the no-take rule of the MPA has been a source of tension within the community (e.g., between fishers and the BBFFS) and contributes to numerous governance challenges.

## 3.4 Governance Challenges

BBSFCA faces a number of existing governance challenges that are shared by other MPAs in the Caribbean (Chakalall et al., 1998, 2007; Dalton et al., 2015): 1) low institutional capacity to govern the MPA; 2) conflict between different actors; and 3) resistance and lack of compliance from community members who lack alternative livelihood options. These challenges reflect an inherent tension and trade-off between conservation and wellbeing. Recognition of existing governance challenges sets the context to explore the final objective of this research, which identifies opportunities to improve the governance of MPAs given a better understanding of the relationships among ecosystem services, social wellbeing, and small-scale fisheries (Chapter 8).

### 3.4.1 Capacity

Under the Beach Control Act (1956) and the Fishing Industry Act (1975) (Ministry of Justice Jamaica, 1991; MOAF, 2011), the state is responsible for overseeing all MPAs at the national level. As such, there are occasional patrols by the Jamaica Constabulary Force Marine Division (i.e., the "marine police", as referenced by locals). However, community-based management plays the largest role in management of the BBSFCA (Chapter 8). A community leader is the

formal manager of the sanctuary and BBFFS, and he also serves as the president of the Bluefields People's Community Association. The Jamaican government, CARIBSAVE (a former non-profit organization), and the Bluefields Environmental Protection Agency (a local non-profit organization funded by Bluefields Bay Seaside Villas, a local high-end tourist resort) loosely partnered to fund daily operational costs for the sanctuary. However, these funds are not always forthcoming, and in 2016, CARIBSAVE collapsed. Six to nine local wardens are employed by BBFFS to patrol the sanctuary daily, but they are dependent on funding. Two wardens will work during one shift, and will rotate every 12 hours (from 7 AM to 7 PM, and vice versa). Wardens patrol BBSFCA a minimum of two times during each shift. Several of the wardens are former fishers themselves and have the trust of some BBFFS members. Yet, enforcement remains a problem for conservation initiatives, as Bluefields Bay covers a wide expanse and once served upwards of ten districts as a fishing ground.

        With a relatively hands-off approach by the government, wardens shoulder a large burden in the active "policing" of the sanctuary. Participatory approaches to monitoring and enforcement are challenging in Jamaican culture, where "informers" fear retaliation through assault, and in worst cases, murder. This 'informer fi dead' (i.e., informer for dead) culture has been criticized in several national news publications (Alexander et al., 2015; "DPP urges J'cans to rise above 'informer fi dead' culture," 2014, "Time to rid country of 'informer fi dead' culture - Mayor Harris," 2014). Some wardens have stated that they have feared for their personal safety, particularly when required to make arrests or confiscate fishing gear. Many community members have indicated they follow this *de facto* code of silence and have grown to accept it as a custom. Thus, illegal activities often go underreported, even if widely known by locals. Identifying strategies to improve ES access for marginalized fishers may provide insights to enhance voluntary compliance (Chap 8.2.2), while subsequently reducing the burden placed on the limited number of people who are currently responsible for enforcing sanctuary rules. Further, knowledge of relational wellbeing could contribute to strategies for fostering community participation in monitoring and enforcement (Chap 8.2.3), although other issues, discussed next, currently stymie this process.

### 3.4.2 Conflict

Conflict over the sanctuary exists on both vertical and horizontal scales. While BBFFS is charged with representing the interests of all members and fishers of the bay area, those outside of the immediate "place-based" district of Belmont (where BBFFS is headquartered) accuse wardens and marine police of corruption and favouritism, saying that they are unfairly targeted for being "outsiders" (Chap 6.2.2). The emergence of these allegations has revealed tensions with authority (vertical conflict) and between districts (horizontal conflict). For wardens and other people who manage the BBSFCA, conservation requires substantial responsibility, as their jobs involve ensuring that the rules of the sanctuary are upheld. This exclusive employment and sudden assignment of authority to fellow community members has fueled feelings of resentment from others in the community. Finally, fishers remain divided on the issue of "if", "how", and "when" BBSFCA benefits them. As such, intra-community conflicts have grown amongst those in favour of the sanctuary and those against it. In Bluefields, these conflicts have resulted in a decline in social wellbeing (Chapter 6) and a hindrance to governance processes (Chapter 8)

The selection of Bluefields as a protected area was driven by bottom-up processes and spearheaded by institutional entrepreneurs (Alexander et al., 2015). Those who supported the BBSFCA expressed that they were motivated by future generations, wanting a future where their children and grandchildren could be food secure, and where everyone could enjoy the beauty of the ocean in perpetuity. However, this site selection was not without controversy. Some criticize the narrow participatory processes that created the MPA, suggesting that these exclusionary processes continue to dictate the MPA's day-to-day activities. For example, some fisher groups (e.g., spear fishers) insinuate that they were purposely left out of the decision-making process (Chap 7.3.1), and that the sanctuary was designed without their consultation or awareness. These beliefs indicate a breakdown of relational wellbeing (e.g., communication, trust) between actors (Chap 6.2.2.2).

For excluded fishers, conservation has been a top-down decree. Conservation is consequently seen as a set of rules that must be followed, rather than as an opportunity for stewardship. These groups are also critical of the motivation behind MPA implementation, expressing that the MPA serves a select few in the interests of tourism (Chap 5.2.5), as is the

case cited by several locals in nearby Sandals Whitehouse ("New Marine Sanctuary," 2015). Currently, the MPA inhibits access to key provisioning and cultural ES (Chap 5.1 & 5.2), leading to a decline in SW for some groups (Chapter 7). Hence, while nearly all fishers support the ecological goals of the sanctuary, those who have been negatively impacted by its boundaries and regulations hold a "not in my backyard" stance and a deep distrust in authority (more in Chapter 8).

### 3.4.3 Alternative Livelihoods

In 2015, CARIBSAVE spearheaded an initiative to support alternative livelihoods for long-term conservation success, although this initiative is now defunct. The "Climate Change Coastal Community Enterprises: Adaptation, Resilience, and Knowledge" (C-ARK) project was funded by the Inter-American Development Bank and was being implemented by CARIBSAVE—a non-profit organization that is also now defunct. C-ARK aimed to provide grants for a select number of community-based organizations (e.g., Bluefields CDC, WOFS) and small businesses in Jamaica, concentrated regionally around the communities of Bluefields and Port Antonio (INSTASAVE, 2015). This funding would have provided aid for community development projects, but also would have assisted local recipients in a transition towards hospitality-based ventures (C-ARK, 2015). One community leader hypothesizes that transition towards hospitality and service-based industries is the key to reducing illegal fishing in BBSFCA, since fishers would then no longer rely on coastal-marine provisioning ES as a primary source of livelihood (Participant 19, personal communication, Aug 29, 2015).

However, exactly how a transition towards hospitality will benefit the large number of fishers who once fished in the bay remains unclear, as transition costs are high (e.g., proper licensing, glass-bottom boats, snorkel equipment) and opportunities are limited (e.g., lack of infrastructure, lack of tourist interest, saturation of existing hospitality industry). Most small-scale fishers in Bluefields have few options for alternative livelihoods (Chap 6.1.1), and are presented with even fewer resources to support their transitions to these alternatives. Without alternatives, fishers must continue to fish to maintain their material wellbeing (Chap 6.1), resulting in a clash between MPA objectives and the needs of certain community groups.

## 3.5 Chapter Summary

In Bluefields, fisheries are small-scale (Sec 3.1), and fishers often engage in either inshore fishing (for coral reef finfish, conch, or lobster near the coast) or offshore fishing (for coastal pelagics in the deep sea, or other species in offshore banks) (Chap 3.2).  Often, fishing is a family occupation, or it is a livelihood where duties are shared between friends.  For this small-scale fishing community, implementation of the Bluefields Bay Special Fishery Conservation Area (Sec 3.3.1), a no-take zone, has resulted in changes to ES access and SW for different community groups (explored in Chapter 7).  With a lack of alternative livelihood options (Sec 3.4.3), this no-take MPA has sparked conflict within the community (e.g., between MPA managers and fishers, between districts) (Sec 3.4.2), which hinders governance of the protected area.  Additional factors such as institutional capacity exacerbate governance issues (Sec 3.4.1).  The following chapter will outline the methods used to complete this research of ecosystem services, social wellbeing, and the governance of MPAs in Bluefields.

# Chapter 4
# Methodology and Methods

In this chapter, I describe the methodology and methods used to conduct this research, including issues of sampling and my role as a researcher in the Jamaican context. I also discuss limitations of these methods, and the strategies that I used to address those limitations.

## 4.1 Methodology

This research employed a mixed methods case study approach.  The chosen case study—Bluefields, Jamaica—has (Marshall & Rossman, 1995):

1) Exploratory elements to generate data for future research on ecosystem services and social wellbeing policy linkages in MPAs;

2) Explanatory elements to explain how ecosystems affect SW through MPA access restrictions); and

3) Descriptive elements to document the ES bundles that are valued by individuals and communities.

In further detail, research involved analysis of: 1) various attributes of individuals, communities, and the current social-ecological system; 2) attitudes, values, emotions, and beliefs as they relate to ES and SW; and 3) social-ecological relationships and how formal/informal societal roles are embedded in these systems—for example, identifying as both a fisher in fisher networks, and as a community member in other respects.

### 4.1.1 Case Study Approach

A case study approach is suitable for situations where: 1) there is a "how" and "why" question; 2) research issues are of a contemporary focus; and 3) the researcher has no control of behavioural events (Yin, 2009).  This research fits these conditions.  First, the overarching research question pertains to "how" ES are linked to SW, and "why" these linkages are changing as a result of MPA implementation.  Second, the backdrop of this research highlights particularities relating to wicked problems such as coastal resource management, climate change, and globalization (Jentoft & Chuenpagdee, 2009) (Chap 3.4).  The main challenges in this case

study context are, therefore, contemporary and ongoing. Third, the social-ecological context of this situation cannot be manipulated for research purposes. This lack of experimental control leads to lower reliability (e.g., reproducibility, replicability) and external validity (Table 4.1)

**Table 4.1 Overview of the limitations specific to case study research (see Table 4.10 for additional limitations and sources of experimental error).**

| Limitation of Case Study Methodology | Definition | Rationale |
|---|---|---|
| Reliability | The consistency of a measurement (e.g., reproducibility, reliability), can be judged over time via test-retest operations (Gomm, 2009). | Case studies are highly contextual, and the researcher has no control over external conditions. |
| Reproducibility | The most important interpretation of reliability (Krippendorff, 2004), referring to "the extent to which similar results can be reproduced in different times and locations and with different coders" (Jackson & Trochim, 2002, p. 327), or the consistency of a measurement after a change in research conditions (Taylor & Kuyatt, 1994). | The social and ecological conditions of a case study cannot be reproduced, particularly in a different location, as they are specific to the environment, community, and time—these elements of a case study are constantly in flux and cannot be manipulated. Further, methods may be tailored to a specific case study (e.g., some cultures may find certain questions offensive). |
| Replicability (also called repeatability) | An aspect of reliability that refers to the consistency of a measurement using the same measurement procedure, same observer, and same location over a short time period (Taylor & Kuyatt, 1994). | Even in keeping the same procedure, observer, and location, case study results could vary over a short time for the same reasons as listed above. |
| External validity | The extent to which the results of research are generalizable (Gomm, 2009). | Each case study is unique, and while the findings of one case study may contribute to another, specific results may not generalizable. For example, in this case study, governance outcomes may have broader applications, but ES and SW preferences and influencing factors may be specific to Bluefields, Jamaica. |

The findings of this research can contribute to a broader empirical understanding of marine protected area governance. As a small-scale fishing community, the chosen case study in Bluefields, Jamaica may also contribute to broader realizations about the impact of MPAs on SSF in the Caribbean and beyond. While case-by-case details may be dissimilar, this research offers rich and detailed insights for analyzing problems of coastal-marine governance.

This qualitative case study-based research employed both deductive and inductive approaches. In qualitative research, objectivity does not refer to controlling variables, but rather, an "openness [and] willingness to listen" (Strauss & Corbin, 1998), which is a crucial aspect of working with people. The social context of this research implies a profound importance of well-attuned listening skills. A deductive approach served to verify the relationships proposed in the conceptual framework (Figure 2.4), while an inductive approach was necessary to accommodate the vast number of unknowns that arose. The inductive lens drew from grounded theory, which is a "theory that was derived from data systematically gathered and analyzed through the research process" (Strauss & Corbin, 1998, p. 13). As research progressed, it became necessary to adjust the research objectives to accommodate emerging data. In this respect, an added advantage of qualitative research when compared with quantitative methods is the flexibility to follow leads that materialize during the data collection process (Charmaz, 2006).

## 4.2 Data Collection Methods

There were five phases in the data collection process, summarized in Table 4.2. I discuss each of these phases in detail in the following subsections.

**Table 4.2 Sequential overview of data collection methods.**

| Phase | Purpose |
|---|---|
| Literature Review (Sec 4.2.1) | • Identify historical information relevant to case study<br>• Increase familiarity with research field<br>• Extract existing data relevant to: 1) case study context (e.g., location, policy, demographics); 2) theoretical context; 3) research questions (e.g., ES, wellbeing, MPAs)<br>• Deductively develop preliminary framework and context-specific questions |
| Scoping and Participant Observation (Sec 4.2.2) | • Engage with actors in communities<br>• Seek out potential research participants<br>• Build rapport with communities<br>• Gain a preliminary and informal understanding of cultural context |
| Semi-structured Interviews (Sec 4.2.3) | • Gather data on ES preferences of different communities and community groups<br>• Examine linkages between ES and SW (ES-SW) in depth<br>• Gain direct anecdotal knowledge about how MPAs have impacted individual and community livelihood |
| Focus Groups (Sec 4.2.4) | • Promote engagement and communication between actors<br>• Generate tangible visual outputs<br>• Validate ES-SW linkages described during interviews<br>• Distinguish differences in ES-SW linkages between different communities and community groups |
| Questionnaires (Sec 4.2.5) | • Add a quantitative component<br>• Triangulate data from focus group and semi-structured interviews<br>• Identify more precise variances in ES and ES-SW linkages between different demographic groups<br>• Identify opportunities for improved governance |

### 4.2.1 Literature Review

Literature review is an essential component of theory development in both inductive and deductive research (Strauss & Corbin, 1998). Review of technical literature (e.g., peer-reviewed literature, technical reports, policy documents) served many purposes (Strauss & Corbin, 1998):

1) Provided a comparison and/or complement for collected data (e.g., the existing categorizations of coastal-marine ES [Table 2.2] and SW [Table 2.3])

2) Enhanced sensitivity during data analysis (e.g., coding interviews and focus groups [Sec 4.5]) and increased analytical effectiveness;

44

3) Developed research to address and build upon existing theories (e.g., linkages between ES and wellbeing [Chapter 7]);

4) Assisted in formulating context-appropriate questions (e.g., interview guide, focus group approach);

5) Identified relevant theoretical gaps; and

6) Served as validation for collected data.

Likewise, nontechnical literature (e.g., letters, diaries, videotapes, newspapers) served as primary data, and also supplemented field data and observations (Strauss & Corbin, 1998, p. 52).

### 4.2.2 Scoping and Participant Observation

The initial scoping stage involved informal engagements and participant observation to gain a foundational understanding of community dynamics and to build social capital.  Scoping occurred in the initial month that I arrived.  During this stage, I observed how the sanctuary was being managed daily, and became acquainted with several fishers from Belmont.  Observational research "entails the systematic noting and recording of events, behaviours, and artefacts in the social setting chosen for study", where the researcher plays an unobtrusive role (Marshall & Rossman, 1995, p. 79).  Observations made during fieldwork (i.e., Jun-Nov 2015) were documented in a journal, organized sequentially by date.  Notes pertained to (Charmaz, 2006):

- Individual and group actions;

- Notable objects, places, and resources (e.g., fish species) of significance;

- Heard anecdotes and other physical observations;

- Significant processes occurring in the setting (e.g., implementation of the C-ARK program discussed in Chapter 3);

- Initial thoughts on what participants define as interesting or troubling (e.g., participants found the lack of markers around the sanctuary troubling);

- Colloquial terms and other nuances of patois;

- Actors and actions in scenes and contexts; and

- Key emerging analytical ideas (e.g., inshore fishers were underrepresented in governance).

### 4.2.3 Semi-Structured Interviews

In-depth interviews (i.e., structured, semi-structured, unstructured) are appropriate for use in research with exploratory, explanatory, and descriptive objectives (Marshall & Rossman, 1995). Interviews are potent tools for the exploration of values, beliefs, behaviour, relationships, emotions, formal/informal roles, and stories (Bryman et al., 2009a). Semi-structured interviews were chosen over structured and unstructured interviews because this method provided a balance of structure and the freedom to explore emerging themes. Semi-structured interviews were used in Bluefields to gain a richer understanding of: 1) which ES are valued (described to participants as "benefits from the ocean"; 2) how different ES fit into bundles; 3) why these bundles are valued; 4) how these bundles have changed in the context of the MPA; and 5) how these changes (if applicable) have affected material, subjective, and relational wellbeing (see Table 4.3 for interview details and Appendix A for the interview guide). A total of 42 interviews were conducted in an informal setting and recorded based on individual permissions. Some interviews were conducted in pairs or groups, at the request of the interviewees involved (see Table 4.10 for limitations). During the interviews, a community researcher facilitated translation and communication. Interviews were transcribed by a professional transcription service in Jamaica (Mead Consultants) to ensure an accurate translation of patois.

**Table 4.3 Community, dates, and interview details.**

| Community | Date | # Interviews | # Interviewees | Community Groups |
|---|---|---|---|---|
| Belmont | 03/08/15 — 26/08/15, 31/08/15 — 01/09/15, 07/09/15 | 20 | 24 | Wardens, inshore fishers, offshore fishers, women |
| Black's Bay | 27/08/15 —28/08/15, 08/09/15 — 10/09/15 | 13 | 18 | Inshore fishers, offshore fishers |
| Paradise | 02/09/15 | 4 | 11 | Inshore fishers, offshore fishers, women |
| Cave | 03/09/15, 05/09/15 | 2 | 2 | Offshore fishers |
| Auldayr | 04/09/15, 11/09/15 | 2 | 3 | Inshore fishers |
| Mearnsville | 09/09/15 | 1 | 1 | Inshore fisher |

### 4.2.4 Focus Groups and Knowledge Maps

Six focus groups were undertaken as a participatory research component with a total of 44 people.  These focus groups were divided into six groups: 1) fishers and women from Paradise; 2) inshore fishers from Belmont and Auldayr; 3) offshore fishers from Belmont; 4) fishers from Black's Bay; 5) women from Belmont; and 6) BBSFCA game wardens (Table 4.4)

**Table 4.4 Dates, target population, and participants of focus groups.**

| Date | Target Population | Participants |
|---|---|---|
| 28/09/15 | Paradise fishers and women | 10 |
| 30/09/15 | Belmont/Auldayr inshore fishers | 4 |
| 30/09/15 | Belmont offshore fishers | 4 |
| 01/10/15 | Black's Bay fishers | 15 |
| 05/10/15 | Belmont women | 5 |
| 06/10/15 | Wardens | 6 |

Focus groups refer to "…a wide range of approaches to [empower] community members to engage in research that increases citizen power and voice in communities" (Jason et al., 2004, p. 4).  In particular, focus groups engaged in a modified approach to participatory rural appraisal (PRA), which is based on the following principles: 1) community participation is fundamental for planning; 2) community experience and knowledge can greatly enhance conservation efforts; and 3) sustainable development should incorporate community-based governance strategies (NES, 1991).  PRA can both mobilize and facilitate community action.  Consequently, the underlying intentions of this methodology align with the bottom-up, community-focused themes of this research. Focus groups were further intended to provide social learning opportunities for researchers and research participants.

Using preliminary data garnered from semi-structured interviews, focus groups participants created knowledge maps to better identify the linkages between ES and SW.  A knowledge map is defined as "an association of items of information, preferably visual, where the association itself creates new, actionable information." (Ebener et al., 2006, p. 636).  The purpose of knowledge maps is to understand complex processes, resources, and people. Knowledge maps are created with four perspectives in mind: 1) the function of the map; 2) the knowledge type; 3) the recipient; and 4) the visualization type (Ebener et al., 2006).  For this

research: 1) the function of the map was to identify the linkages between ES and SW; 2) the knowledge type was local knowledge; 3) the recipients were participating communities and the academic community; and finally, 4) the visualization type was a hand-drawn conceptual diagram. Knowledge maps can be applied to decision-making at community, policy, and institutional levels (Ebener et al., 2006), making the outcomes applicable to objectives three and four of this research (Box 4.1).

**Box 4.1 Review of research objectives.**

1) Identify the ecosystem service bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);
2) Define how a marine protected area (MPA) has changed access to these bundles for each group;
3) **Examine how changes in access to these bundles have affected social wellbeing (i.e., material, subjective, and relational wellbeing); and**
4) **Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).**

Five steps are described in making a conventional knowledge map: 1) acquire data; 2) manipulate data; 3) store data; 4) process data; and 5) visualize data (Ebener et al., 2006, p. 637). In the context of my research, data were acquired in the interview phase, before being manipulated in a preliminary non-computer assisted open coding process based on interview notes. Emerging themes and categories from open coding were categorized and transformed into three lists: 1) important benefits from the ocean; 2) tangible components of "having a good life"; and 3) intangible components of "living a good life" (Table 4.5). Focus group participants then processed the data by verifying each list. Participants argued that certain aspects of social wellbeing were inseparable. In response, they were given the option of "bundling" items on the latter two lists (for example, love with sharing, home with food and water). Next, participants were asked to select and rank their top three items or bundles from each list (i.e., from one being the most important to three being the least important). While the results from the ranking exercise may not have been quantifiably accurate (e.g., it may not be possible to choose between education and health, or happiness and independence), the exercise generated fruitful and insightful discussion and provided additional information on community context. Following data

processing, the top three selections from each list were visualized in a knowledge map, where participants were asked to draw and discuss connections between each item.

**Table 4.5 Itemized lists generated from interviews and used in focus groups.**

| List Theme | Nodes Generated from Interviews | Research Relevance |
|---|---|---|
| Benefits from the ocean | Reduce storms, protect beach sand, catch water, water cycling, fish breeding, fish and sea life, decoration, tourism, fun and recreation, positive inspiration, healing | Ecosystem services |
| Tangible items required to have a good life | Education, home, family and friends, health, job and alternative livelihood, food and water, money and "more things", religion* | Material wellbeing, relational wellbeing |
| Intangible items required to live a good life | Independence, sustainability, being yourself, sharing, happiness, comfort, hope, living right or having a good heart, love, working hard, providing for family | Relational wellbeing, subjective wellbeing |

*Limitation: religion could also belong under intangible items, tangible parts of religion referred to religious networks and community*

Focus group sessions were recorded on a voice recorder after each participant granted his or her permission. First, the idea and definition of a knowledge map was explained to each group, followed by an example (see Appendix B for focus group guide). Participants were then guided through the creation process by the community researcher and myself. Literacy rates are low amongst many fishers and community members (Chap 1.3.1), so they were unable to create these knowledge maps without assistance.

### 4.2.5 Questionnaires

Following the completion of interviews and focus group activities, another stage of open coding was conducted to identify emerging trends and themes from both phases. Specifically, the results from open coding were used to create a structured questionnaire for administration as the third and final phase of data collection (see Appendix C for questionnaire) (see Sec 4.3 & 4.4 for sampling and recruitment). The questionnaire produced a mix of data forms, including: 1) nominal data (e.g., Which community are you from?); 2) ordinal data (e.g., Rank the following preferences based on your understanding of the purpose of the sanctuary); 3) interval data (e.g., On a scale of 1 to 3, how easy is it for you to achieve the following components of wellbeing?);

and 4) ratio data (e.g., What proportion of the following [vendors, family, etc.] do you sell your fish to? Write your answer in percentages). This questionnaire served to: 1) gain a quantitative perspective on MPA governance preferences and the impact of the MPA on ES-SW linkages; and 2) triangulate data from interviews and focus groups, where triangulation refers to a data corroboration process in which different angles and methods are adopted to study the same phenomenon (Gibbert & Ruigrok, 2010).

Logistically, four community researchers were hired to administer the questionnaires. Candidates for these positions were filled based on the advice of community leaders. Each community researcher was given a goal of completing twenty questionnaires, and was paid approximately CAD$5 for each completed questionnaire. Questionnaire respondents were incentivized to complete the questionnaire with a cellular phone credit worth approximately CAD$1 (see Table 4.10 for drawbacks of using incentives). Prior to data collection, a meeting was held to train each researcher on how to properly administer the questionnaire. After this training session, community researchers paired up and conducted pilot questionnaires with one another and with other community members. The questionnaires completed during the pilot process were not used in analysis. Collectively, researchers scheduled days on which they were all available to work, as instructions specified that each questionnaire needed to be completed in the presence of other community researchers (i.e., researchers could not complete questionnaires on their own in their spare time). At the end of each working day, questionnaires were collected and checked for completion and accuracy.

### 4.2.6 Linkage with Objectives

Table 4.6 identifies the methods used to examine each research objective. There is intentional overlap amongst the methods; this overlap validates and triangulates the collected data. Participant observation provided a better understanding of the context behind each objective. As a researcher from another country and culture, this context was invaluable to finding meaning and making sense of the final data set. Semi-structured interviews and focus groups served an exploratory and explanatory purpose, while questionnaires fulfilled a descriptive research element, described in Section 4.2.

**Table 4.6 Summary of research objectives, sub-questions, and applicable methods.**

| Objective | Sub-questions | Methods |
|---|---|---|
| 1) Identify the ecosystem service bundles that are valued by different community groups. | a) How do community members perceive their relationship with the environment? | Participant observation, interviews, focus groups |
| | b) What ES are vital to wellbeing? | Interviews, focus groups |
| | c) Are there notable ecological (tangible) bundles, and sociocultural (intangible) bundles? | Interviews, focus groups |
| 2) Define how the MPA has changed access to these bundles for each group. | a) Has MPA implementation affected access to ES bundles? If yes, how? If no, how have fishers adapted to compensate? | Literature review, interviews, focus groups, questionnaires |
| 3) Examine how changes in access to these bundles have affected material wellbeing, subjective, and relational wellbeing. | How has the MPA changed: a) Material (tangible) wellbeing (e.g., financial capital, natural resources)? | Interviews, focus groups, questionnaires |
| | b) Individual fisher identity, safety, and security? | Interviews, questionnaires |
| | c) Fishers' relationships with others? | Participant observation, interviews, questionnaires |
| 4) Link ES and SW data to challenge conventional governance (e.g., siting, design, management) of marine protected areas. | a) How can the MPA be improved to better support individual and community wellbeing? | Literature review, interviews, questionnaires |
| | b) How can MPAs be designed so that they allow for greater flexibility and access to essential ES bundles? | Literature review, interviews, questionnaires |

## 4.3 Sampling

Sampling was purposive and non-random. Non-random sampling may reduce coverage error (i.e., when the chosen sample is not the target population) and increase sampling efficiency (see Table 4.10 for more on errors). Snowball sampling (i.e., process by which new participants are identified by previous participants) occurred to increase sample size when needed. The Bluefields Bay Special Fishery Conservation Area (BBSFCA) was used as a location to narrow the geospatial scope of this research (e.g., by recruiting from various landing sites affected by the BBSFCA). Within the broader community of Bluefields, five districts were approached for participation: Auldayr, Belmont (and Black's Bay), Cave, Mearnsville, and Paradise. Black's Bay—technically a part of Belmont—was treated as a separate group based on participant

observation (e.g., social circles were distinct between Black's Bay and the rest of Belmont), and initial data from semi-structured interviews, in which some residents of Black's Bay referred to the rest of Belmont as an "other". These districts were selected based on four factors: 1) proximity to the sanctuary; 2) previously established social networks to facilitate recruitment; 3) known density of fishers (assessed based on a list of registered fishers provided by the Department of Fisheries); and 4) physical accessibility (e.g., remoteness, distance from base, ease of public transportation).

Within each district, different groups were sampled to gain a breadth of perspective, including: inshore fishers (e.g., those without access to boats, spear fishers, net fishers), offshore fishers (e.g., line fishers), and non-fishers (e.g., women, some wardens). The chosen groups represent diverse opinions within the overall target population (i.e., small-scale fishing community affected by MPA implementation), and share a reliance on coastal-marine resources. The specific target population for each phase was selected based on the following traits: occupation, gender, age (age 18 and above), landing site, and home district. In the following thesis chapters, people who participated in interviews and focus groups are referred to as "participants", while those who responded to questionnaires are referred to as "respondents". This distinction stems from the active nature of qualitative methods (e.g., interviews, focus groups), where individuals "participate" in a reciprocal exchange of knowledge with the researcher and other participants, versus the typically unidirectional exchange of knowledge in questionnaires, where individuals "respond" to the questions being asked (Morse, 1991). However, in the discussion of experimental error (Table 4.10), the term "respondent" refers to both participants and respondents, as "respondent" is the dominant term used in literature.

## 4.4 Recruitment

For semi-structured interviews, my community researcher and I frequented landing sites in the Bluefields area on foot and used a "cold call" technique to approach fishers on the beach or on the street (fishers were visually identified if they were carrying large amounts of fish or fishing gear). Since many of the fishers lived near their landing sites, we also visited surrounding districts in search of fishers, and asked available community members for the location or homes

of known fishers.  Certain fishers were recommended by community contacts affiliated with the Bluefields Bay Fishermen's Friendly Society (BBFFS).  Non-fishing community members were recruited in a similar cold-call fashion.  Wardens were recruited during their working hours at BBFFS headquarters.

At the end of each interview, interviewees were asked if they wished to participate in further research.  If participants replied yes, their phone numbers (or other forms of contact information) were recorded.  All interested parties were subsequently contacted during the organizing phase of focus groups to confirm interest.  Separate efforts were made to organize a focus group consisting only of non-fishing women, who may perform different roles in the community and offer a diverse perspective.  The organization of focus groups (Table 4.3, above) was based on participant availability and the number of interested participants in each district (for example, interest from fishers in Auldayr was low, so interested fishers were combined with Belmont fishers).  Originally, Black's Bay inshore fishers and offshore fishers were planned as separate focus groups.  However, one of the focus group times fell during Hurricane Joaquin. Many fishers were preoccupied with preparing for the storm, and thus the two focus groups were inadvertently combined into one.  Likewise, in Paradise, while two focus groups were originally planned, time constraints led to the two focus groups being combined.  As such, both focus groups had many attendants, which may have discouraged intimate discussion (see Table 4.10 for more limitations).

Questionnaire respondents were recruited using the cold call technique that was applied for semi-structured interviews.  In addition, a list of registered fishers was provided by the Jamaican Ministry of Agriculture and Fisheries to aid in identifying fishers of different districts and government-recognized landing sites.

## 4.5 Analysis

In this section, I describe the methods used to analyze the data collected from semi-structured interviews, focus groups, and questionnaires.  I conclude by explaining how I synthesized the multiple components of this analysis.

### 4.5.1 Interview Analysis

Semi-structured interviews have rich details and lack standardized responses. Therefore, data are commonly viewed through a qualitative lens. Qualitative analysis provides instantaneous feedback, so researchers can alter theories, objectives, or questions as they learn more about their research (di Cicco-Bloom & Crabtree, 2006). This iterative process is conducive to grounded theory, a common inductive approach in qualitative research (Sec 4.1). In this project, an inductive framework served to test new theories and formulate new questions throughout the data collection process (Bryman et al., 2009b). Specifically, interview data were analyzed by qualitative coding, which describes a subjective procedure to data analysis (Richards, 2005). Coding is loosely defined as data reduction, or "the process of organizing a large amount of data into smaller segments that, when needed, can be retrieved easily" (Bailey, 2007, p. 127).

Coding of interview transcripts was completed through Computer Assisted Qualitative Data Analysis (CAQDAS) (Yin, 2011). NVivo was also selected as the primary data management tool based on: 1) suitable analytical power for this project; 2) value as an organizational tool while analyzing transcripts and literature; and 3) ease of use. The analysis process followed three steps: 1) open coding (i.e., initial coding, or descriptive coding and topic coding); 2) axial coding (i.e., focused coding, or analytical coding); and 3) selective coding (Bailey, 2007; Creswell, 2007; Richards, 2005). Through the open coding process, text from each interview transcript was organized into deductive (e.g., ES categories that appear in literature) and inductive categories (e.g., different cultural facets of social wellbeing that emerged through analysis)—these categories are labeled in the NVivo program as "nodes". NVivo essentially acted as a digital filing cabinet, whereby each node represented a folder, and quotes from different transcripts comprised the contents of the folder. The program is a beneficial organizational tool, since it keeps track of the sources for different quotes, and tallies the number of participants for each node. Multiple rounds of open coding were completed for each transcript. Once the open coding process was complete, individual nodes were axially coded and selectively coded for broader themes.

**Table 4.7 Description of steps followed during each stage of coding.**

| Coding Stage | Actions |
| --- | --- |
| Open | First, each "case" (i.e., interviewee) was labeled based on descriptive characteristics (e.g., community, gender, fishing method). Then, data (i.e., excerpts of transcripts) were categorized by the identification of keywords, phrases, and topics. Concepts from literature review were used as a foundation, including indicators of ES (Table 2.2) and indicators of SW (Table 2.3). These categorizations, known as "nodes" in NVivo, were hypothesized based on deductive analysis of existing research. New nodes were also established inductively when needed, based on emerging data. The open coding process was highly iterative, and many cases were recoded as new codes emerged while coding later cases. |
| Axial | Relationships between nodes established through open coding were defined. During axial coding, relationships and themes within the conceptual framework of this research project were highlighted (Fig 3) (e.g., cultural service bundles linked with components of relational wellbeing). Some texts exhibited "overlapping" codes, where statements were significant to multiple nodes. For example, some participants discussed the significance of the beach as a gathering point for family and friends, these statements would be coded as relating to both cultural ecosystem services and relational wellbeing. Overlapping codes were indications of interconnected themes. Focus group activities were also used for axial coding, as participants were asked to draw connections (see Sec 4.2.4) between nodes identified during preliminary coding. |
| Selective | A focal theme was determined to serve as an anchor point for all other themes. Selective coding further served as a validation process, an opportunity to revise codes, and to establish codes to satisfy missing linkages (Bryman et al., 2009b; Gomm, 2009). |

The layouts of Chapter 5 (ecosystem services) and Chapter 6 (social wellbeing) were determined based on the results of this interview analysis. Specifically, the themes that emerged from axial coding were used to guide the section headings in these chapters. Some sections were further divided into subsections based on the nodes within each theme. The order of the sections and subsections was determined by the ratio of mention in interviews—for example, in Chapter 5.2—about cultural ecosystem services—since "heritage value" was referenced in 60% of interviews while "knowledge systems" was referenced in only 24%, "heritage value" was presented first in the chapter. The purpose of this ordering is to enhance the organization of ideas and to orient the reader (e.g., to provide the reader with a general sense of community priorities). Therefore, the sections and subsections signify ordinal value (i.e., are ranked), but should not be acknowledged as actual ratios (e.g., heritage value, referenced in 60% of interviews, does not make it 2.5 times more important than knowledge systems, at 24%). The qualitative nature of semi-structured interviews and the relatively small sample size detract from

the quantitative robustness required to validate ratio values. Within each section and subsection, quotes were presented as qualitative evidence to support research findings. These quotes were subjectively evaluated and selected based on their representation of the specified theme (see Table 4.10 for limitations). Names were stripped from each quote and replaced with randomized letters to anonymize interview participants and their networks.

### 4.5.2 Focus Group Analysis

Focus group analysis differs from interview analysis in that it must account for the complexities of group interaction (Krueger, 1998) (e.g., "group-think", enhanced social desirability bias). Focus group recordings were not transcribed. Therefore, analysis was based on audio recordings and physical outputs. Focus group audio was analyzed using similar procedures applied during interview analysis, but the following considerations were given special attention (Krueger, 1998):

- Context (e.g., Is there a reaction triggered by a political, social, environmental, and/or personal stimulus?);
- Internal consistency (e.g., Do participants change their minds during the discussion after hearing others' opinions?);
- Frequency of comments (e.g., the number of times something is mentioned);
- Extensiveness of comments (e.g., the number of people that talk about a particular issue);
- Intensity of comments (e.g., any special attention noted by intensity, passion, or depth of feeling in word choice or vocalization);
- Specificity of responses (e.g., responses based on specific or personal experiences should be given more weight than vague and impersonal responses).

However, the specific topic of interest during focus group analysis was the connection between ecosystem services and social wellbeing, rather than each topic individually. The justification for this focus is twofold: 1) the ranking process of ES and SW was not to produce quantifiable results (e.g., it may be impossible to choose between education, food, and shelter with any reliable certainty), but rather to generate discussion and to prime focus group participants for creating knowledge maps; and 2) while focus group discussions provided

56

valuable supplementary context, saturation for both ES and SW (as individual concepts) occurred during the interview phase.  Since the prompted discussions during focus groups were primarily used to contextualize interview data, no direct quotations from this phase appear in later results chapters.

However, each focus group's knowledge map captured some key points of discussion. These knowledge maps were translated into one summary figure (Figure 7.6) and six individual descriptive matrices (one for each focus group) (Chap 7.2).  The figures produced from focus group data serve a qualitative purpose—to provide the reader with a general sense of each focus group's ordinal ES and SW priorities, and explicit ES-SW linkages.  To create the summary figure, all "bundled" nodes from individual focus groups (see Sec 4.2.4) were aggregated into broader "master bundles" (review Table 4.5 for original nodes).  Master bundles were selected to ease the data visualization process.  While this process of aggregation may raise concern over loss of detail, the details for each focus group were preserved in their individual matrices.  In total, five master bundles were created for social wellbeing (Table 4.8).  The components of these master bundles were then tallied for each focus group (Table 4.8).  In the summary figure, master bundles were represented by size based on their tally totals, where the highest tallied master bundle appears largest.  The same tallying process was repeated for ecosystem service nodes (Table 4.9).  SW bundles appear in a column on the right side of the summary figure, while ES nodes appear on the left (ordered and sized according to tally totals).  The lines joining the two columns reflect the connections drawn between ES and SW in the knowledge maps, where thicker lines represent a higher number of total connections across all focus groups.

**Table 4.8 Social wellbeing data used for focus group summary figure.**

| Summary Bundle | Focus Group | Component Node or Bundle | Tally |
|---|---|---|---|
| Home, family, food and water, health, religion | Belmont inshore | Family | 1 |
| | | Religion | 1 |
| | | Food and water, home | 1 |
| | Belmont offshore | Family | 1 |
| | | Home | 1 |
| | | Health | 1 |
| | | Food and water | 1 |
| | Black's Bay | Health | 1 |
| | | Family | 1 |
| | Paradise | Health | 1 |
| | | Religion | 1 |
| | | Food and Water | 1 |
| | | Family | 1 |
| | Wardens | Family, home, religion | 1 |
| | | Food and water | 1 |
| | Women | Religion | 1 |
| | | Home, family, health | 1 |
| | | **TOTAL** | **17** |
| Love, good heart, sharing | Belmont inshore | Love, sharing | 1 |
| | Belmont offshore | Love, sharing | 1 |
| | Black's Bay | Love | 1 |
| | | Good heart | 1 |
| | Paradise | Love | 1 |
| | | Sharing | 1 |
| | Wardens | Love, good heart, sharing | 1 |
| | Women | Love, good heart, sharing | 1 |
| | | **TOTAL** | **8** |
| Money, education, job | Belmont inshore | Education | 1 |
| | Belmont offshore | | 0 |
| | Black's Bay | Money | 1 |
| | Paradise | Money | 1 |
| | Wardens | Education, job, money | 1 |
| | Women | Money | 1 |
| | | **TOTAL** | **5** |
| Happiness, hope | Belmont inshore | | 0 |
| | Belmont offshore | Happiness | 1 |
| | Black's Bay | | 0 |
| | Paradise | Happiness | 1 |
| | Wardens | Happiness, hope | 1 |
| | Women | Hope | 1 |
| | | **TOTAL** | **4** |
| Independence, be yourself, work hard | Belmont inshore | Independence, work hard, being yourself | 1 |
| | Belmont offshore | | 0 |
| | Black's Bay | Work hard | 1 |
| | Paradise | | 0 |
| | Wardens | | 0 |
| | Women | Independence, be yourself | 1 |
| | | **TOTAL** | **3** |

**Table 4.9 Ecosystem service tally data used for focus group summary figure.**

| Node | Belmont inshore | Belmont offshore | Black's Bay | Paradise | Wardens | Women | Total |
|---|---|---|---|---|---|---|---|
| Fish and sea life | 1 | 1 | 1 | 1 | 1 | 1 | **6** |
| Tourism | 1 | 1 | 1 | 1 | 1 | 0 | **5** |
| Beach protection | 0 | 0 | 1 | 1 | 1 | 0 | **3** |
| Habitat and refugia | 1 | 0 | 0 | 0 | 0 | 1 | **2** |
| Water cycle | 0 | 1 | 0 | 0 | 0 | 1 | **2** |

Finally, each knowledge map was converted into a descriptive visual matrix (adapted from Rocha et al., 2015). In each matrix (i.e., for each focus group), ecosystem service nodes formed the rows and social wellbeing nodes/bundles formed the columns. The cells for each node were coloured on sliding scale based on the number of connections to the node itself, where darker cells indicated the most number of connections, and lighter cells indicated fewer connections. For example, nodes with five or more connections to other nodes were coloured black, whereas nodes with only one connection were coloured white (see Chapter 7). Connections between ES and SW, as illustrated in each knowledge map, were symbolized with an X in each matrix.

### 4.5.3 Questionnaire Analysis

Questionnaire results were quantitatively coded into an Excel spreadsheet based on a code reference. Each multiple-choice response was coded as a number (e.g., A=1, B=2, D-3). Yes or no questions were coded using a binary interval (i.e., 0 for no, 1 for yes). Ordinal questions and interval questions were coded directly as the rank/interval they received (e.g., if response A was ranked as number 1, it was coded as 1; if a respondent said that accessing education was easy, the response was coded as 1. The code "99" signified that the question was not applicable, whereas the code "88" signified that the respondent did not provide an answer. Using Excel, the data were then analyzed to produce descriptive statistics (e.g., what % of each community group supports the MPA, what % of fishers have alternative livelihoods, which alternative livelihood is the most popular). Excel was further used to create visual outputs (e.g., bar charts, stacked bar charts, pie charts).

### 4.5.4 Synthesis

Since the focus group guide and questionnaire were developed based on results from the semi-structured interviews, data from the interviews were used as the foundation for this analysis. The interview data provided qualitative, exploratory richness, providing the primary context required for interpreting additional data. Context, in this instance, refers to: 1) "strong influences on [policy] implementation outcomes and strategies in a wide range of circumstances"; 2) anything of or directly related to implementing a policy—in this case, an MPA; and 3) "alternative explanations for past performance that create new insights into reasons for performance [of policies]" (Honadle, 1999, p. 79). Focus groups further enhanced the understanding of context, while serving as an opportunity to explore the connections between themes that emerged during the interview process. As mentioned in Table 4.2, focus groups were used as a form of participatory axial coding. The structured questionnaires were a confirmatory process for triangulation, and added a quantitative component to emergent research themes. Synthesis of data occurred through a process of layering to form a full picture—starting with interviews, then focus groups, and finally, questionnaire results.

## 4.6 Positionality

I recognize that I am an Asian-Canadian, middle-class cisgender female who is approaching this research from a "privileged position of power (academically and personally)" (Trussell, 2014, p. 343). My perspectives are shaped by this identity, and my identity impacts how I am perceived in interactions with the world around me (Bourke, 2014). For example, many community members identified me as a privileged "tourist", and I had to acknowledge that this identity would impact my interactions with the community (e.g., they may believe that I am not invested in the outcomes of the MPA). Likewise, I had to accept and live within Jamaican culture as an outsider and a woman, which at times interfered with my research—for example, by being openly sexualized by male participants through catcalls and comments about my appearance. To conduct this research responsibly, I had to be reflexive and conscious of how my identity influenced the narrative of this research. Reflexivity is defined as the ability to manage and critically reflect upon one's identity in a research setting (Bourke, 2014; Trussell, 2014).

Reflexivity can be used to "understand the personal, social, and political aspects of the research process and on the kind of knowledge that is produced" (Trussell, 2014, p. 344), or in other words, to analyze my positionality as a researcher (Carstensen-Egwuom, 2014). I maintained this reflexivity by keeping a journal of major events, alongside my mental and emotional state, during the research process and then used this journal as a point of self-reflection.

## 4.7 Assumptions and Limitations

There are four general assumptions associated with qualitative research. These assumptions are that the participant: 1) knows what is being asked (e.g., an initial concern with one of the questionnaire questions was about "landing site", as community researchers had to communicate that a landing site is where a fisher's boat is docked, or where a fisher typically begins their fishing trip); 2) knows the answer (e.g., some fishers were unable to answer whether fishing had given them the life they wanted because they could not envision any other life); 3) is willing to accept the answer (e.g., some fishers had difficulty accepting and expressing their role in the exploitation of coastal-marine habitats); and 4) is willing to admit the answer to others (e.g., some fishers were defensive or chose not to discuss issues surrounding illegal fishing) (Guppy & Gray, 2008). The first assumption pertains to factors such as question wording, culture, language, and literacy. The final three assumptions are dependent on knowledge, self-awareness, and honesty.

A general limitation of qualitative methods is the inability to manipulate research conditions (discussed in Sec 4.1). In Table 4.10, I elaborate on the additional limitations of this qualitative research by providing potential sources of sampling error, researcher error, and respondent error. Sampling error inherently impacted the internal validity of this research, since certain community groups (e.g., night fishers) were missing from the sample. Researcher error permeated each interaction that I shared, and further coloured my perception of the data during analysis. I identified with and was identified as an outsider to the community (Sec 4.6). Further, I overcame consistency issues as coding progressed, where codes evolved during analysis, leading to multiple iterations of coding. Concerning respondent error, many respondents were deeply untrusting of outsiders, potentially drawing inaccurate and untruthful responses.

61

Bluefields has attracted attention from a variety of universities (e.g., Binghamton University, University of Missouri, University of the West Indies, University of Waterloo) (Participant 5, personal communication, Jul 8, 2015), leading some respondents to participate despite expressing that they were tired of being research subjects. Some respondents also felt that the research being conducted on the community would never directly benefit them. As such, respondents may not have been engaged enough to give meaningful responses. In efforts to overcome these negative associations, I spent an extensive amount of time walking around each district and building rapport. Further, conducting my research in multiple phases supported a sharing and feedback process for preliminary results (e.g., focus groups were given an overview of my findings from the semi-structured interviews). This sharing process promoted trust and enhanced community engagement in this research.

**Table 4.10 Description of categories of error and how they apply in this project.**

| | Potential Errors |
|---|---|
| Sampling | • Non-random sampling methods potentially increase sampling bias (i.e., there may be a tendency towards choosing participants for characteristics such as availability, willingness, and friendliness), sampling error (i.e., the chosen sample may not be truly representative of the target population as a whole), and non-response error (i.e., not considering the perspectives of those who choose not to participate) (Salant & Dillman, 1994).<br>• Factors such a personal safety (e.g., not wanting to conduct interviews after dark) may increase overall sampling error (e.g., night fishers were excluded).<br>• Belmont fishers and non-fishers are overrepresented in the sample because of snowball sampling and high accessibility. |
| Researcher | • The presence of a researcher automatically results in situational change. Therefore, a primary limitation of this research is the inability to directly measure indicators in a natural setting.<br>• The unstructured nature of interviews and focus groups will lead to a diversity of answers. As such, the researcher runs a risk of being inconsistent when coding responses during analysis.<br>• Challenges of participant observation are the recurrence of ethical dilemmas (e.g., permissions to observe) and severe observer effects, where the researcher imparts their own values as they translate perception into written observations. Data can be misinterpreted from a sociocultural perspective and extremely difficult to replicate (Marshall & Rossman, 1995).<br>• Other issues include confirmation bias (i.e., placing emphasis on what you wish to find rather than properly analyzing data) and measurement error (i.e., poor research design, improper variables measured) (Creswell, 2007).<br>• The use of multiple community researchers during the questionnaire phase could result in lower consistency between results, particularly since some fishers required that questions be explained and interpreted.<br>• Questionnaire respondents were given the option of choosing multiple fishing methods, and as such, their primary fishing method (i.e., inshore, offshore) could not be distilled from the data.<br>• Questionnaires and focus groups were developed based on preliminary data analysis of interviews in the field, and as such, may have missed data that emerged after detailed analysis.<br>• With a dependence on community researchers and transcription services to aid in language skills and cultural cues, data could be misinterpreted.<br>• Researcher resilience in the field may affect research quality (Reed & Peters, 2004).<br>• Objectivity is difficult to maintain during the data collection and analysis process. |
| Respondent | • Problems exist with acquiescence bias (i.e., the tendency for participants to agree to what is being presented), social desirability bias (i.e., feeling the need to conform with social norms), and inaccurate responses from lack of interest and energy (Bryman et al., 2009a)<br>• Social desirability bias is particularly prevalent in focus group scenarios, or when more than one interviewee was questioned at the same time.<br>• Rapport developed over time between interviewer and respondent potentially affects internal validity. The respondent could develop a desire to please the interviewer rather than providing true information (Bryman et al., 2009c).<br>• Since questionnaires—targeted towards fishers only—were incentivized with cellular phone credits, this may have led to non-fishing community members claiming to be fishers, and subsequently providing false responses. As such, questionnaire incentives may have increased coverage error (e.g., non-fishers answering the questionnaires). Further, fishers may have rushed or made up responses to collect incentives sooner. |

## 4.8 Ethics

This project received full clearance from the University of Waterloo Office of Research Ethics on May 13, 2015 (ORE #: 20685) (see Appendix D for ethics clearance notice). A modification was submitted while in the field to remove a proposed research component (geospatial survey) and to replace it with another component (structured written questionnaire). This modification was approved on October 20, 2015.

## 4.9 Conclusion

In this chapter, I described the methodology used in this research, which incorporated elements of both inductive and deductive reasoning (Sec 4.1). Then, I outlined the data collection and data analysis process (Sec 4.2-4.5), and discussed potential limitations to my research design (Sec 4.6-4.7). This research used a mixed methods case study approach with exploratory, explanatory, and descriptive dimensions. To conduct this research, I used the following methods: literature review (Sec 4.2.1), participant observation (Sec 4.2.2), semi-structured interviews (Sec 4.2.3), focus groups (Sec 4.2.4), and structured questionnaires (Sec 4.2.5). The fieldwork components of data collection (i.e., interviews, focus groups, questionnaires) took place between June to November 2015. Data collected in the field were analyzed through a combination of qualitative coding (e.g., NVivo, creating figures) and descriptive statistical analysis using Microsoft Excel. Synthesized data will be presented in the following chapters alongside a discussion of their significance, beginning with findings on the perception of ecosystem services in Bluefields (Chapter 5).

# Chapter 5

## Perceptions of Ecosystem Services in Bluefields

In this chapter, I present the findings for objective one of this thesis (Box 5.1) by identifying the ecosystem service (ES) bundles that are valued by different community groups. ES are broadly known as "the benefits that people obtain from ecosystems" (MA, 2005, p. 40) (see Chap 2.2). However, authors have pointed to the distinction between ecosystem services, as objective processes and products of nature, versus the goods and benefits that ES provide, where the idea of "benefits" may be subjective based on context-specific preferences (Table 5.1) (Böhnke-Henrichs et al., 2013; de Groot et al., 2002; Fisher et al., 2009). Therefore, to truly understand ES and their value, it becomes essential to explore the lived experiences of those who benefit from these services. Examining perceptions of ES in Bluefields is germane to identifying what the community needs and values from the ocean, and how MPA decision-making can balance access to these key ES with conservation efforts in future planning and implementation.

**Box 5.1 Review of research objectives**

> 1) **Identify the ecosystem service bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);**
> 2) Define how a marine protected area (MPA) has changed access to these bundles for each group;
> 3) Examine how changes in access to these bundles have affected social wellbeing (i.e., material, subjective, and relational wellbeing); and
> 4) Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).

In the following sections, I examine the four ES categories presented in Chapter 2.2: provisioning (Sec 5.1), cultural (Sec 5.2), supporting (Sec 5.3), and regulating (Sec 5.4) (MA, 2005). I disaggregate each category into further subcategories based on semi-structured interview data (Table 5.1) (see Chapter 4 for methods). Finally, I conclude the chapter by reviewing key ES and synthesizing these ES as bundles (Figure 5.8). Analyzing ES as bundles "emphasizes the linked nature of [ecosystem services]" and "capture[s] how different ecosystem services interact" (Raudsepp-Hearne et al., 2010, p. 5245). Linking multiple ES provides

opportunities to identify synergies and tradeoffs, which better informs the governance of these services as a whole (Raudsepp-Hearne et al., 2010).

**Table 5.1 Categories and subcategories of ES in Bluefields, alongside the benefits that are provided by these services (adapted from Böhnke-Henrichs et al., 2013, p. 141).**

| ES category (MA, 2005) | ES indicators* | Benefits provided by ES Bluefields | % of interviews |
|---|---|---|---|
| Provisioning ES (Sec 5.1) | Fish (Sec 5.1.1) | Nutrition, protein, livelihood, enjoyment from eating and/or fishing, culture | 100 |
| | Other sea life (Sec 5.1.2) | Nutrition, protein, livelihood, enjoyment from eating and/or fishing, culture | 62 |
| | Raw materials for art and decoration (Sec 5.1.3) | Livelihood, enjoyment from making or owning, culture | 24 |
| | Abiotic and medicinal resources (Sec 5.1.4) | Fresh water for drinking or agriculture through desalination, minerals, healing properties, culture | 19 |
| Cultural ES (Sec 5.2) | Recreation and leisure (Sec 5.2.1) | Enjoyment, relaxation, belonging, rejuvenation, social capital and cohesion, culture | 67 |
| | Aesthetic value (Sec 5.2.2) | Enjoyment, relaxation, belonging, rejuvenation, hope, optimism | 67 |
| | Cultural heritage value (Sec 5.2.3) | Belonging, pride, cultural practices and knowledge, sense of community, sense of place, social cohesion | 60 |
| | Knowledge systems and educational value (Sec 5.2.4) | Intellectual inspiration, curiosity, information, education, appreciation for knowledge and the environment | 24 |
| | Tourism (Sec 5.2.5) | Livelihood, employment | 21 |
| | Spiritual and religious value (Sec 5.2.6) | Relaxation, hope, comfort, strengthening of belief and spirituality | 10 |
| Supporting ES (Sec 5.3) | Habitat and refugia for reproduction and feeding (Sec 5.3.1) | Healthier and more resilient fish stocks, larger fish, fish for the future | 74 |
| | Hydrological cycling (Sec 5.3.2) | Fresh water, precipitation for crops, water catchment | 10 |
| | Biodiversity (Sec 5.3.3) | More fish to sell, greater resilience to environmental shocks (e.g., hurricane, disease), increased aesthetics value, fish for the future | 7 |
| Regulating ES (Sec 5.4) | Weather and storm mitigation (Sec 5.4.1) | Decreased storm intensity, less damage to infrastructure | 14 |
| | Coastal erosion prevention (Sec 5.4.2) | Better quality beaches for recreation and tourism, preservation of coastal homes and properties | 14 |

*\* (Böhnke-Henrichs et al., 2013; Hernández-Morcillo et al., 2013; Liquete et al., 2013; MA, 2005)*

## 5.1 Provisioning Ecosystem Services

Provisioning services are the raw material benefits provided by ecosystems (MA, 2005). When questioned about benefits received from the ocean, all fishers and community members described their dependence on fish as a natural resource. In addition to fish, participants also discussed other culturally and socioeconomically significant material resources (e.g., ornamental resources, biochemical, fresh water) (Liquete et al., 2013; MA, 2005). Participants noted the following provisioning ES as particularly important (Böhnke-Henrichs et al., 2013; MA, 2005):

1) Fish;
2) Other sea life (e.g., lobster, conch, octopus);
3) Raw materials for art and decoration; and
4) Abiotic and medicinal resources.

I present these provisioning ES in the following subsections.

### 5.1.1 Fish

Fish represent food security and financial security for many small-scale fishing communities (Béné, 2006; FAO, 2014; Kittinger et al., 2015; McClanahan et al., 2015). In Bluefields, fish is an important food source, "[The ocean] provides food for people, it puts food on people's tables. So fish and fish products…we need [them] in order to get protein" (1). Fish, as a material resource, further supplies a livelihood for many fishers, fish vendors, and their families, as stated by one fisher: "[From the ocean] I get fish and make money" (10). Table 5.2 summarizes popular species within Bluefields.

**Table 5.2 List of consumable fish compiled through mention by fishers and community members, categorized by the areas where they are fished (CARICOM, 2000).**

| Zone | Fish |
|---|---|
| Inshore: using spear gun, net, fish pot | Barracuda (*Sphyraena* sp.), butterfish (Stromateidae), cross bar (sci. name unknown), doctorfish (*Acanthurus chirurgus*), goatfish or red mullet (Mullidae), white grunt (*Haemulon plumierii*), sweetlips grunt (*Plectorhinchus* sp.), moonshine or bigeyes (*Priacanthus* sp.), parrotfish (Scaridae), puffer or soursop (Tetraodontidae), shotfish (sci. name unknown), sprat (Sprattus), squirrelfish (Holocentridae), red snapper (*Lutjanus campechanus*), yellowtail snapper (*Ocyurus chrysurus*), turbot (*Scophthalmus maximus*), wrenchman or soldierfish (Myripristinae) |
| Offshore: using fish pot, line | Bonito (*Sarda sarda)*, black jack or jack fish (*Caranx lugubris*), kingfish (*Caranx ignobolis*), mahi mahi or dolphinfish (*Coryphaena hippurus*), marlin (Istiophoridae), tuna (Scombridae), wahoo (*Acanthocybium solandri*) |

However, in many small-scale fishing communities, fish offer more than just physical sustenance—fish is a celebrated culture (Khakzad & Griffith, 2016; Macken-Walsh, 2012; Macleod, 2002) (Sec 5.2). Of all fish species mentioned by participants, one fish came up most frequently: parrotfish (Scaridae). Parrotfish is a "culturally significant species" (Tengberg et al., 2012) in Jamaica, meaning that the fish is highly valued in Jamaican culture (Figure 5.1). As described in a national news article: "Jamaicans love parrotfish. Steamed, fried or roasted, the brightly coloured sea creature is a common feature on many a dinner plate. It's also a favourite at the beach and at roadside eateries on the weekend" (Thompson, 2014). When community members were asked about the types of fish that were most important to them, they most frequently mentioned parrotfish. These fish play an indispensable role in both social and ecological aspects of Bluefields Bay. From an ecological perspective, one warden stated,

> The parrotfish is one of the most important because it cleans the ocean, and as a result, most environmentalists would not recommend that we consume parrotfish. It also helps with the building of the sand and stuff out there. (1)

The ecological importance of parrotfish in coastal-marine ecosystems is widely acknowledged by both mainstream media (Algar, 2014; Beans, 2014; ICRI, 2012; Jackson, 2014; Johnson, 2014a; Laccino, 2014) and academic literature (Cramer et al., 2017; Hughes et al., 1987; Morgan & Kench, 2016; Mumby et al., 2007). Parrotfish are important grazers that maintain coral reefs by regulating the overgrowth of harmful macroalgae (Hughes, 1994; Hughes et al., 1987; Jackson et al., 2014; Mumby et al., 2007). As such, some countries in the Caribbean (e.g., Bermuda, Barbuda, Bonaire, Belize) have instituted a parrotfish ban, where the capture of parrotfish is restricted or prohibited (Johnson, 2014a; O'Farrell et al., 2016; WRI, 2009).

**Figure 5.1 Fresh-caught parrotfish being sold directly to community members at a local landing site (Photo: Cheryl Chan).**

In Bluefields, wardens believe that a potential parrotfish ban (Lee, 2014; "Save the parrotfish!," 2016; Thompson, 2014) would heighten existing conflicts over MPA restrictions within the community (Chap 3.4.2) (Participant 9, personal communication, Oct 2, 2015). Yet, parrotfish are critical for the recovery and development of coral reefs, which in turn would positively impact other species that depend on this habitat (Jackson et al., 2014). While the no-take MPA in Bluefields aims to protect all fish, many parrotfish are still fished outside of its boundaries. These findings support the need for additional rules and regulations beyond the MPA. Furthermore, there is a need to address the tension associated with restricting access to a culturally significant species for conservation purposes, as these restrictions could negatively impact wellbeing (e.g., cultural heritage, livelihoods).

**5.1.2 Other Sea Life**

Jamaican cultural cuisine utilizes a variety of sea life as seafood, including sea puss or octopus (*Octopus*), whelks or sea snail (Trochidae), Queen Conch (*Strombus gigas*) and Caribbean Spiny Lobster (*Panulirus argus*) (Figure 5.2) (CARICOM, 2000). In Jamaica, the capture and sale of

Queen Conch and Caribbean Spiny Lobster are prohibited during certain months of the year. Open season for Queen Conch is April 1-June 30, although other species of Gastropoda (sometimes colloquially referred to as "conch") can be consumed year-round. Conversely, for Caribbean Spiny Lobster, open season is July 1-March 31. Research has indicated that both the Queen Conch and Spiny Lobster are being fished at unsustainable levels (Catarci, 2004; FAO, n.d.; IUCN, 2015b; WECAFC, 2014). Lobster and conch are not only popular in Jamaican communities, but are frequently exported to other countries (CARIBSAVE, 2012). One participant alluded to the high demand for conch, which he witnessed while fishing in an industrialized fishing bank called Pedro Cays (CARIBSAVE, 2012):

> The first time I go to Pedro Cays, I saw a lot of shells, like conch shells. A lot of conch shells, it was like a mountain—a mountain. And when I saw those conch shells, I said to a man, "What is that?" And he said, "They're fish shells, man," I said, "No man, shells couldn't be so tall, can't grow so." He said, "Yeah man, they're shells". When I went closer, I see, I realized that they were fish shells. A lot of shells, piled up. Fishermen go out, catch the shell, and catch the conch and throw it behind them, throw it behind them and build a mountain—way up, way up, so, build up, build up further and further up on shore, higher and higher. (18)
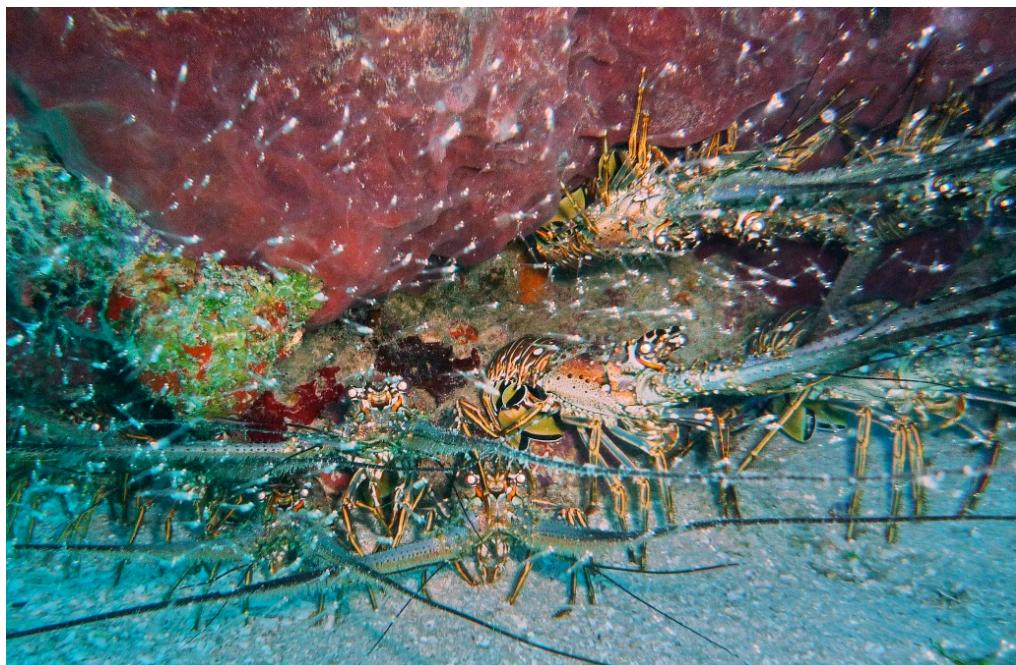


**Figure 5.2 Caribbean Spiny Lobster under a coral overhang (Photo: Cheryl Chan).**

Regarding lobster, one fisher noted that the Bluefields Bay Special Fishery Conservation Area (BBSFCA) had become a refuge for lobster, which is considered a high-value species for many spear and pot fishers (CARICOM, 2000):

> Alright, where they built the sanctuary now, I can guarantee you if you carry me right there now, I can make US$200, and that was not when they built the sanctuary, that was before…All the fucking lobsters are in there, all the fish, in this special place that they don't know, that they have bordered in. (15)

Another fisher shared similar thoughts on lobster: "We used to catch lobster, but for a long while now we don't catch any more lobster" (16).  Again, the stark contrast between the seemingly unsustainable harvest of conch in Pedro Cays and the lack of access to lobster in Bluefields highlights a tension between the need for conservation and the impact of conservation areas on social wellbeing (Chapter 7).

### 5.1.3 Art and Decoration

Apart from reliance on the ocean for nourishment, people also described the use of raw materials from the sea in art and decoration (e.g., ornamental conch shells, painted star fish) (Böhnke-Henrichs et al., 2013; de Groot et al., 2002), which can have both cultural (e.g., identity, aesthetic enjoyment) and financial benefits (e.g., to sell to locals or tourists) (Figure 5.3).  One fisher described the use of conch shells as an ornamental decoration: "Well, you see, like conch lives in the water, so you can get the shell from the ocean.  It's beautiful and long lasting; you know it doesn't rot or anything" (6).  Women in the community mentioned the broad use of coral and other sea life in jewellery and décor (e.g., coral for bracelets, necklaces, mollusc shells for lamp shades)—although, extracting coral from the sea is illegal (Participant 1, personal communication, Aug 3, 2015).  In Jamaica, inspiration from the sea also influences decorative items sold to tourists.  Artists at local markets draw inspiration from the ocean into their crafts and artwork, demonstrating a "bundling" of provisioning ES and cultural ES (Sec 5.2).

**Figure 5.3 Colourful conch shells, cleaned and prepared for sale (Photo: Cheryl Chan).**

### 5.1.4 Abiotic and Medicinal Resources

Certain community members discussed the medicinal and health benefits of coastal-marine resources. Some of these resources are abiotic—a term referring to a natural resource derived from a non-living thing (MA, 2005). For example, one participant made a unique argument for the importance of salt water as a potential source of fresh water, arguing that desalination could mean water security for the future of the island:

> Jamaica has a lot of rivers and stuff, so we don't really need to take the sea water and convert it to fresh water to utilize it, so that's not something that we're doing presently in Jamaica. If needs be, then, it would have been a solution, but presently, we don't have to. (1)

Drought has impacted some districts in Bluefields (e.g., Auldayr) (Participant 4, personal communication, Aug 3, 2015), and more broadly, other parishes in Jamaica (e.g., St. Thomas, St. Catherine, Clarendon, St. Elizabeth, Manchester) (Fulton, 2013). Support for desalination has been echoed in national news outlets ("Desalination is the answer," 2012, "Why not desalination," 2015), although this technology has also been a point of contention ("Desalination plant not a viable option," 2014). Nonetheless, in 2016, the Jamaica Public Service Company (JPS) commissioned the island's first desalination plant ("JPS commissions desalination plant," 2016, "JPS looks to the sea," 2016). Thus, while desalination is not relied upon in Bluefields, it may become a relevant technology in the future to provide the community with fresh water.

72

As an example of medicinal benefits, men consume Irish moss (*Chondrus crispus*) (often found in shakes and drinks), believing that it encourages virility and strength (Participant 40, personal communication, Sep 20, 2015).  One participant suggested that seawater offers healing and medicinal properties: "Well, I told you just about medicinal benefits; it has minerals.  If you have a little cut or something and you go to the sea it heals faster" (7).  Other participants shared the belief that the sea can heal or enhance the healing of small wounds such as cuts, bites, and bruises.  These shared beliefs highlight, again, the bundling of provisioning and cultural ES.

## 5.2 Cultural Ecosystem Services

Cultural services are the "nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences" (MA, 2005, p. 40), or "the nonmaterial benefits that people derive from human-ecological relations" (Chan et al. 2011, p. 206 as cited in Chan, Guerry, et al., 2012).  Exploring cultural benefits through the perspectives of a small-scale fishing community frames the ocean as more than just a food source, but also as a "way of life with ethical, political, or spiritual aspects" (Chan, Guerry, et al., 2012, p. 745).  For example, in Bluefields, the ocean provides a vast number of important cultural benefits, including (Hernández-Morcillo et al., 2013; MA, 2005; Milcu et al., 2013):

1) Recreation and social cohesion;
2) Aesthetic value and inspiration for art;
3) Cultural heritage value;
4) Knowledge systems and educational value;
5) Tourism; and
6) Spiritual and religious value.

I discuss each of these cultural ecosystem services next.

### 5.2.1 Recreation and Social Cohesion

With more than 50% of the population living within 1.5 km of the coastline (CARIBSAVE, 2012), beaches in Jamaica are significant gathering points for friends and family (Figure 5.4).  Spending time by the ocean can promote the growth and maintenance of relationships (Böhnke-Henrichs et al., 2013).  For example, local beaches are a popular place to gather with loved ones,

offering benefits of recreational value and opportunities to boost social cohesion.  Gathering on the beach encourages the development of relational wellbeing (Chap 6.2):

> Look how we gather, here, right now.  If the beach wasn't here we wouldn't be here now, you know?  Why didn't we gather in the bush over there?  We gather on the beach because it is more important to us. (13)

Jamaicans also enjoy the ocean's recreational benefits on an individual level, through activities that potentially enhance subjective wellbeing by lifting spirits or relieving stress (Chap 6.3).  Participants reported that their individual activities include bathing, swimming, exercising in the sea, and fishing for sport.  In fact, one participant shared a belief about bathing in the sea:

> There are also native beliefs about the sea, for instance, if you go there at 4 o'clock in the evening and bring JA$10, and a JA$20 coin to pay the sea, and take a bath up to your neck before having a job interview, and you fill a drum right at that area and go home, you bathe with that water…it's for good luck. (42)

This story is an example of everyday activities that carry a deeper cultural meaning.



**Figure 5.4 Jamaicans enjoying Easter Monday at Bluefields Beach (Photo: Frank Lomann).**

### 5.2.2 Aesthetic Value and Inspiration for Art

In addition to recreational benefits, the ocean further supports subjective wellbeing (Chap 6.3) through aesthetic value, defined as the appearance and beauty of a land or seascape (MA, 2005). Aesthetic values provide benefits for the mind and spirit: "Most of the time I just sit by the sea side and just meditate on the ocean. It gives a lot of good inspiration too, you know?" (3); "Sometimes you come by and it makes you feel joyful. You have this joyful happy feeling in your spirit. You get into the water, you ride the waves, and it brings joy" (4); and "[The ocean] means the world to me, I can't live without it. I don't like the mountains, I feel claustrophobic. I like to sit and look at the horizons, there's opportunity on the horizons" (36). Many participants recounted the reflective moments they experienced while looking out into the water, and feelings of calm. In these instances, the ocean inspired feelings of happiness, hope, and peace.

Moreover, aesthetic seascapes inspire creativity for art (Figure 5.5). Art provides benefits to subjective wellbeing through enjoyment and satisfaction during the creative process. Likewise, some products provide a livelihood to certain community members, thereby bolstering material wellbeing (Chap 6.1): "Some will make earrings [with coral]. If you go to the Craft Market you will see them, and people walk on the streets and sell them also" (32). Finally, art supports relational wellbeing (Chap 6.2) by serving as a vessel for cultural heritage, which will be discussed in the following subsection.



**Figure 5.5 Local artist, Jah Calo, in his art studio, Studio Black (Photo: Heidi Savery).**

### 5.2.3 Cultural Heritage Value

Heritage can be both tangible and intangible. UNESCO (2016) defines cultural heritage as "the intangible attributes of a group or society that are inherited from past generations". Tangible cultural heritage refers to events, processes, buildings, places, monuments, and artifacts "endowed with cultural significance", where cultural values are attributed to features such as "aesthetic quality, spiritual meaning, social function, and historical significance" (Wright & Eppink, 2016, p. 277). In Bluefields, community members identify with "the sea", and this identity is integral to cultural heritage. Some families have been relying on the ocean for generations: "[Fishing is] a tradition that we were born into in this community" (25). Another participant referred to the ocean as an inheritance: "[The ocean] is an inheritance for us— generation after generation, we feed our families from it. It is a wide scale. It does a lot for us" (32). Furthermore, for some community members, parcels of coastal land have been passed down from one generation to the next (Participant 43, personal communication, Nov 1, 2015). There are deep ancestral ties to the landscape, the seascape, and the resources of both. These shared values and spaces contribute to relational and subjective wellbeing (Chap 6.2 and 6.3).

Some community members have expressed concern over the changing environment, out of fear that these changes will lead to the deterioration of culturally cherished resources and places. For example, in discussing the issues of overfishing, one fisher stated, "You have to think about your kids that are coming up. But some guys don't think about that" (17). Many recognize that familiar landscapes and seascapes are undergoing a multitude of changes (e.g., from tourism, globalization, environmental change), leading to the emergence of solastalgia— defined as "the pain or sickness caused by the loss of, or inability to derive solace from, the present state of one's home environment" (Albrecht, 2006, p. 35). Feelings of solastalgia have been expressed as discomfort, anxiety, and anger, indicating a decline in subjective wellbeing (Chap 6.3). These feelings of pain may inhibit governance processes, if morphed into misplaced resentment towards those perceived as the drivers of change (e.g., sanctuary leaders).

Alongside multi-generational ties, community members in Bluefields have unique personal relationships with the seascape. For these individuals, the ocean has provided benefits such as sense of place and identity: "Oh, [the ocean is] my heart—my heart, sister. I don't know

what I would do without the ocean" (15).  Some fishers feel belonging and ease: "Comfortable. When I'm in the ocean it makes me relaxed, comfortable; out there is my comfort zone" (6), even if these feelings required nurturing: "Sometimes you want to throw up because your stomach is upset when you're new to out there, but you get used to the roughness and rawness, you don't feel it anymore" (37).  Some fishers equated the ocean with life itself: "Oh yeah, yeah! The ocean is my life!  The ocean is a part of me.  The blood in the ocean runs in me and my blood runs in the ocean [laugh]" (10); "You see the ocean, you get to the ocean, and you just see life. Without it, a lot wouldn't exist—the birds, the fish, everything, the breeze—the ocean just represents life to me" (4); or, "When I think about the ocean I'm just thinking about my life story" (1).  In Bluefields, perception of sea and self are greatly entangled.

### 5.2.4 Knowledge Systems and Educational Value

A knowledge system is defined as "what structures the interactions between different agents and holders of knowledge in a relatively cohesive and bounded manner" (Jäger et al., 2013, p. 73). Fishing is a social occupation involving teamwork and communication, where knowledge systems are embedded in the skills, geospatial seascape memories (e.g., fishing locations, protective bays), and experiences of fishers.  This practical knowledge is transferred both horizontally (e.g., within generations between friends): "No, [my father] wasn't a fisherman. You have this guy named Q. He's the one who taught me fishing and taught me how to captain, and R. Those are two guys, who taught me about fishing" (8); and vertically (e.g., across generations within family lineages): "My brother-in-law and uncle too; they were the ones who taught me to fish" (2).  One spear fisher explained an example of fisher knowledge:

> Because we do spear fishing, it teaches us a lot.  You can learn a lot of
> things from it.  You may go out there today and have to find different style
> or method of catching the fish.  It's not easy sometimes, there are fish that
> are sly and you have to be skilled to catch them. (31)

Similarly, non-fishers in the community have their own knowledge systems about the ocean (e.g., how to prepare fish, where the best beaches are, how to swim).  In this context, knowledge systems within Bluefields represent a sharing of knowledge between individuals, and thus also form an aspect of relational wellbeing (Chap 6.2).

From a formal education perspective, the ocean is taught in local schools (Figure 5.6) and in community workshops held by BBFFS. One warden clarified the benefits of these workshops for Bluefields: "I mean, with the Society being in the area, doing workshops and so on, people are far more knowledgeable about the importance of the sea" (1); more specifically:

> Some of these young fishermen were educated about the importance of the corals, the sea grass, because they were just going to sea and didn't know the importance of these things. It wasn't until we had workshops here that some of the divers knew that the coral was alive, a live animal. (5)

Sanctuary managers are hoping that increased scientific knowledge of coastal-marine ecology will lead to better governance of coastal-marine resources through more sustainable fishing practices and informed purchase decisions (e.g., not buying undersized fish, not buying parrotfish, switching to freshwater fish).



**Figure 5.6 Environmental pledge at a primary school in St. Elizabeth (Photo: Cheryl Chan).**

### 5.2.5 Tourism

Tourism is a major source of income for the Jamaican economy (UN, 2015), and the industry is undergoing continued growth (Thame, 2016). In 2015, over 3.5 million international tourists visited the island (Jamaica Tourist Board, 2015). Whether coming from afar or within, Jamaica is well known for its aesthetic of warm sunshine, mélange of green-blue spectrum waters, and fine sandy beaches. Summarized by one community member, "Tourists come for the three S': sun, sea, and sand" (Participant 19, personal communication, Aug 20, 2015). In Bluefields, the tourism industry is relatively small, with a handful of local guesthouses, four midrange hotels, and a small chain of high-end resort villas. Yet, tourism provides the community with a range of financial benefits. For example, most people in Bluefields have friends or family who are employed by the industry, or are directly employed themselves. Moreover, some fishers in Bluefields sell their catch (e.g., lobster, dolphinfish, marlin) to tourists on the beach, or to hotels and resorts (Figure 5.7). Finally, tourism provides opportunities for alternative livelihoods, as discussed by one warden,

> [The Bluefields Bay Fishermen's Friendly Society (BBFFS) is] looking at purchasing a glass bottom boat so we can do tours, so again, that would be income generation. We are also looking at crafts, how we could sell crafts to make money from that to put into a fund [for fishers]. [NGOs] have also looked at retrofitting local fishermen's vessels to meet the tourism standards so they can give tours. This would provide an alternative for fishermen. So they now earn money from giving tours in the bay. (1)

Nevertheless, tourism is not without issue, as mentioned by one fisher:

> I'm a spear fisherman too, and I don't think they should put all the blame [for the environment] on the spear fisherman. They should place blame on the soakaway pits, the hotels that are acting commercially and leaching into the ocean and not practicing best environmental practices, and stop attacking just spear fishermen. Spear fishing is just hunting, and hunting doesn't do great destruction to anything, because you are not doing it for commercial purposes, really. (36)

Implications of the tourism industry on wellbeing are explored further in Chapter 7.

**Figure 5.7 Dolphinfish, or mahi mahi, a popular pelagic fish with tourists (Photo: Cheryl Chan).**

### 5.2.6 Spiritual and Religious Value

Religion is a fundamental component of culture in Jamaica: "Well, what motivates me in my day to day life is my personal relationship with my Creator. I love waking up in the morning, saying my prayers, reading my Bible, having that personal dialogue with God" (4). The country is predominantly Christian (main denominations include Church of God, Seventh-Day Adventists, and Pentecostal), and roughly 70% of Jamaicans identify with being Christian (U.S. Department of State, 2012). The island is also the birth place of Rastafarianism—practiced by less than 8% of the population (U.S. Department of State, 2012). Yet, regardless of religious background or denomination, several people noted a spiritual or religious connection with the ocean:

> The experience that I get from the sea—it's only there that I see God…I don't see God in any movements again. You're looking on a sea coming to you—that can just come right over you, you have to move away from it—it comes right over, so you have to just—sometimes it comes upon you so suddenly. That's where you see God's power. (23)

80

Or,

> How do I feel when I look at [the ocean]?  Well I feel good in a way to
> know that God has created something so big, wide and it is right there not
> drying up or anything.  It's just there. (33)

Religion supports both subjective wellbeing (e.g., identity, comfort) (Chap 6.3) and relational wellbeing (e.g., social networks) (Chap 6.2) in Bluefields, signaling that a severance of ties with the sea could have detrimental spiritual impacts.

## 5.3 Supporting Ecosystem Services

Supporting services are the services that underpin and support all other ecosystem services (MA, 2005), or as analogized by Barbier et al. (2011, p. 170), supporting services are "akin to the infrastructure that provides the necessary conditions under which inputs can be usefully combined to provide intermediate and final goods and services of value to society".  In Bluefields, community members identified the following supporting services as particularly important (MA, 2005):

1)  Habitat for reproduction and feeding;
2)  Hydrological cycling; and
3)  Biodiversity.

I describe these supporting ecosystem services next.

### 5.3.1 Habitat for Reproduction and Feeding

Coral reef, sea grass, and mangroves are important ecosystems for fish and sea life (Abrami et al., 2015; Barbier et al., 2011; Burke & Maidens, 2004; White et al., 2010).  All three ecosystems serve as crucial nursery habitats (Lele et al., 2013), which offer benefits such as the replenishing of fish stocks.  As a supporting service, coastal-marine habitats and refugia are bundled tightly with provisioning ES, since they enhance populations of fish and other sea life (Sec 5.1.1 & 5.1.2).  In Bluefields, the importance of these ecosystems was well recognized by fishers and non-fishers alike.  Nursery habitats were acknowledged through the mention of "eggs", "breed", or "breeding".  A few fishers noted the role of mangroves for reproduction and as refuge for juvenile fish: "The mangroves, it is a part of the sea life, and the fish come into the mangrove

and lay their eggs, you know" (35); and "Because more mangroves are down there and the fish gather more in the mangroves, like down by Paradise the young fish grow in the mangroves there" (13). Similarly, the role of seagrass for harbouring fish eggs was factored into the siting of the BBSFCA (Participant 19, personal communication, Nov 14, 2015).

Despite crediting mangroves and seagrass habitats, the most pronounced concern for fishers and other community members was the quality of coral reef habitats. Some people also voiced support for the artificial reefs (i.e., EcoReefs) in the BBSFCA, which were installed by the Inter-American Institute for Cooperation of Agriculture (IICA) and the Government of Jamaica in 2011 to improve habitat quality (IICA, 2011; Rudolph, 2012). Whether artificial or natural, fishers see reef habitats as important foraging grounds for key inshore species (e.g., lobster, parrotfish, snapper): "When we would go outside for the fish, whatever size we caught, we can't do that again; the fish have left from the deep to the sanctuary to feed" (29). Other fishers lamented the perceived migratory nature of fish and sea life (discussed in Chap 2.1.2 as a governance challenge), thereby signifying the understanding of certain habitats as refugia— defined as habitat for migratory and transient species (Costanza et al., 1997).

Studies have supported the short-distance migration patterns of Caribbean coral reef finfish amongst coral reef, seagrass bed, and mangrove habitats for different life stages— although, only if these habitats have high connectivity and accessibility (Huijbers et al., 2015; Mumby, 2006; Nagelkerken et al., 2008). Researchers have also observed patterns of day to night migrations (e.g., from deep sea to shallow habitat, and from reef to seagrass bed) (Nagelkerken et al., 2000, 2008). Therefore, there are small windows for potential "spillover effects" if fishers catch fish while they have "spilled out" of the BBSFCA (containing seagrass beds and coral reef) on their way to other areas. However, a study of connectivity between Caribbean MPAs found that most coral reef finfish showed high fidelity to MPAs (e.g., either staying in one MPA or migrating from one MPA to an adjacent and proximal MPA) (Pittman et al., 2014). Moreover, while there is some evidence for fish participating in long distance regional migrations (e.g., distances of 40 km or more) (Pittman et al., 2014), there is a lack of evidence for whether these migrations benefit fishers. Therefore, the amount of spillover benefit from habitat and refugia is uncertain in the Caribbean context. Broader research on MPAs from

other regions has suggested that there are opportunities for spillover to benefit adjacent local artisanal fisheries (Halpern et al., 2010; Stobart et al., 2009), although the amount of benefit may depend on networks of linked MPAs and the distribution of habitats within and around the MPAs (Forcada et al., 2009; Halpern et al., 2010). Arguably, in Bluefields, the site of the BBSFCA is congruent with the local fishery, itself. Thus, regardless of whether spillover effects are present, some fisher groups may not have the material or social resources to traverse beyond the MPA to reap the spillover benefits in "adjacent fisheries".

### 5.3.2 Water Cycle

The water cycle illustrates the continuous movement of water through processes such as evaporation, condensation, and precipitation (Chahine, 1992). One community leader emphasized the importance of the water cycle in Jamaica:

> I see that [the ocean] sustains our lives in two ways that I can think of: it sustains our live in terms of providing water, which is then converted into rain…and then, as I said, the body of water is what the sun would have fed on to provide clouds that then turn into rain. (19)

Similarly, several hinted at the relationship between the watershed and the sea:

> Yeah it's very important 'cause I told you I was born by the river and the sea. The river washes into the sea and the sea wash out so I was born right in between there, the river and the ocean. (3)

And,

> [The ocean] protects us from flood because like when it rains, if you never had the ocean the place flood out, water runs from off the land, off the hills into the sea so it is like a catchment for the water from the land. So it protects us, too. (13)

Water cycling plays a fundamental role in ensuring human access to fresh water for consumption and agriculture (MA, 2005). Although the water cycle lacked ubiquitous recognition, community members discussed the importance of fresh water, itself, as a resource and benefit. Further, the water cycle was identified as an important priority for homes in two focus group discussions (discussed later, in Chap 7.2)

83

### 5.3.3 Biodiversity

There is a divide in current literature over if and how biodiversity fits into the ecosystem services framework. Some authors treat biodiversity as a separate entity (see Bennett et al., 2015; Mertz et al., 2007; Schröter et al., 2014), while others group biodiversity into ES bundles (see Nicholson et al., 2009; Raudsepp-Hearne et al., 2010). Lele et al. (2013) suggest that the isolation of biodiversity originates from the discipline of conservation biology and stems from the belief that biodiversity has intrinsic value, and therefore should not be classified using the anthropocentric and economic approach that accompanies the ES framework. Lele et al. (2013) contest that placing biodiversity on a "pedestal" unfairly neglects the process of how biodiversity is valued by people (i.e., the anthropocentric). The authors conclude that this standalone view of biodiversity should be challenged. This argument is also supported by the Convention on Biological Diversity: "The values of biodiversity, should be interpreted in the broadest sense, including environmental, cultural, economic and intrinsic values" (CBD, 2013, p. 2). To capture these environmental, cultural, and potential economic values, biodiversity will be treated as a supporting ecosystem service in this research.

In low-income countries, such as Jamaica, people typically derive income from natural resources. Some have referred to these economies as "biomass-based economies", and have asserted that countries with these economies would suffer the most from biodiversity loss (Hicks, 2011). Along these lines, fishers in Bluefields recognize biodiversity in terms of catch diversity, with one commenting that they are now catching a greater variety of fish than in years past. As one warden said,

> So species of fish that you hadn't seen for years, like they had died out, they are coming back. A lot of the seaside birds that had gone away, like the pelicans and those birds that feed on fish, they were not a lot of fish here, so they wouldn't come. But those birds are coming back. (4)

Likewise, other community members shared observations of positive changes in biodiversity since the implementation of the BBSFCA:

> But I know I see a lot of changes with lobster at the dock—right under the foot—I saw a lobster that I've never seen there before. I see a lot of fish that I've never seen there before. (10)

84

Biodiversity contributes to the health and resilience of fish stocks, a provisioning ES, and the aesthetic value of ocean, a cultural ES (Sec 5.2.2).

## 5.4 Regulating Ecosystem Services

Regulating services are the benefits "obtained from the regulation of ecosystem processes" (MA, 2005, p. 40). Regulating services were the least mentioned class of ecosystem services in the collected data. There were two main regulating services described by communities in Bluefields (Liquete et al., 2013):

1) Weather and storm mitigation; and
2) Coastal erosion prevention.

I elaborate on these regulating ecosystem services next.

### 5.4.1 Weather and Storm Mitigation

Weather can be distinguished from climate based on the reference of time, as defined by NASA (2005): "weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere 'behaves' over relatively long periods of time." Weather mitigation describes the influence of ecosystems on local weather patterns and conditions (e.g., thermoregulation, relative humidity) (Liquete et al., 2013; MA, 2005). The most prominent form of weather mitigation—as perceived by communities in Bluefields—was the heat-tempering effect of the ocean breeze (i.e., thermoregulation): "Well, sometimes we get cool breeze from the sea—I get cool breeze from the sea" (24). In addition, one warden described the protective benefits of the reef in mitigating storm and surf intensity: "The ocean itself provides some level of security for us who live on land. So, the reefs are important to protect us from getting big waves and stuff" (1). However, only eight community members acknowledged these benefits. Weather and storm mitigation relates to tourism (Sec 5.2.5) and recreation (Sec 5.2.1), as this regulating service maintains aesthetic values and protects coastal-marine areas from damage.

### 5.4.2 Coastal Erosion Prevention

Coastal erosion prevention is the "natural defense of the coastal zone against inundation and erosion from waves, storms, or sea level rise" (Liquete et al., 2013, p. 6). Three people in

Bluefields referenced the importance of healthy coral reefs in coastal erosion prevention, or more specifically, protecting the beach and coastal recreation areas. The preservation of coastal areas (e.g., coral reefs, beaches) is vital for both community members (e.g., as areas to live, or areas to build relational wellbeing) and for attracting tourists (e.g., for aesthetics). One fisher even indicated the need for human-made interventions in the absence of adequate natural barriers:

> They used to have some railings in the water to break the waves and keep the sands to shore. Now that the [Urban Development Corporation] has taken over, they have taken all those things away, they didn't know the benefit of it, and now the beach is mashed up. Maybe they figured it would harbour Congree—the eel—and probably damage people; I don't know…but if you go around to the post office, going towards Belmont, they have started to build another shed on the lower side, if you look over that side, right now some of those rails are still in the water. If you look at that side, there is a lot of sand there. The rails are there; it's a good thing to have in the water. (39)

Others noted the role of the parrotfish in creating and replenishing sediment for beaches (Morgan & Kench, 2016): "Well, every fish is important. They say probably the parrot, because it makes sand, so that's an important fish" (6). Yet, despite acknowledging this fact, the fisher who made this statement caught parrotfish quite frequently—as do a majority of other fishers in Jamaica (CARICOM, 2000). This inconsistency highlights one of the key conservation challenges in Bluefields: conservation efforts often conflict with the present needs and demands of the community (Chap 3.4.2).

## 5.5 Chapter Summary and Ecosystem Service Bundles

Data collected from semi-structured interviews indicate that a wide range of ES is important in Bluefields. Community perceptions of the ocean suggest that the presence, function, and benefits of coastal-marine ecosystem services are tacitly understood. Participants discussed all four categories of ES during the interview process. Regarding provisioning ES (Sec 5.1), the topic of fish came up most frequently, although the community also highlighted the importance of other sea life (e.g., Queen Conch, Caribbean Spiny Lobster), raw materials (e.g., conch shells for decoration), and abiotic and medicinal resources (e.g., minerals, Irish Moss). People further spoke about a diverse range of cultural ES (Sec 5.2), including recreation, aesthetic value,

cultural heritage value, knowledge and educational value, tourism, and spiritual and religious value.  Finally, supporting ES (e.g., habitat, hydrological cycling, biodiversity) (Sec 5.3) and regulating ES (e.g., weather and storm mitigation, coastal erosion prevention) (Sec 5.4) were also mentioned, although with less frequency.  Figure 5.8 summarizes which and how key ecosystem services may exist in ES bundles.  Provisioning and cultural bundles are positioned at the top of the "staircase" to reflect their prominence in the data, as expressed by community members (review Table 5.1).  In the following chapter, I examine perceptions of social wellbeing in Bluefields.  Then, in Chapter 7, utilizing the conceptual framework that I presented in Chapter 2, I integrate and synthesize perceptions of ES and SW in Bluefields before concluding with the implications of these findings for governance in Chapter 8.

|  | **Provisioning** | **Cultural** | **Supporting** |
|---|---|---|---|
| **Cultural** | Fishing as an identity, culture, and way of life<br>Raw materials for art and other cultural artefacts<br>Medicinal resources as ethnobotany passed on through knowledge systems<br>Coastal-marine ecosystems as a) educational resources and b) inspiration for art | | |
| **Supporting** | Habitats and refugia support fish stocks and sea life<br>Biodiversity enhances resilience of fish stocks and allows fishers to diversify their fishing income<br>Water cycle provides water | Habitats offering sense of place<br>Habitats protecting and ensuring fish for future generations<br>Biodiversity enhancing aesthetic value | |
| **Regulating** | Storm mitigation not only protects people on land, but also fish and sea life underwater<br>Coastal erosion prevention protects fish and sea life from harmful sediment | Erosion prevention preserves aesthetic value and recreation/tourist areas (e.g., beaches)<br>Thermoregulation encourages gatherings by the beach (e.g., to escape from heat) | Healthy habitats (e.g., mangroves, coral reefs) are more effective at mitigating storm intensity<br>Hydrological cycles (e.g., rainfall) impact coastal erosion |

**Figure 5.8 Proposed ecosystem service bundle "staircase" in Bluefields.**

**\*All possible pairings of ES categories are represented in the figure**

# Chapter 6

# Perceptions of Social Wellbeing in Bluefields

In this chapter, I examine perceptions of social wellbeing in Bluefields. This foundational understanding of social wellbeing sets the context to analyze objective three of this thesis (Box 6.1), which defines changes in ES access and impacts on SW since MPA implementation.

**Box 6.1 Review of research objectives**

> 1) Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);
> 2) Define how a marine protected area (MPA) has changed access to these bundles for each group;
> 3) **Examine how changes in access to these bundles have affected social wellbeing (SW) (i.e., material, subjective, and relational wellbeing);** and
> 4) Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).

Social wellbeing has three dimensions: 1) material wellbeing (i.e., economic situation, the tangible material of life, physical environment); 2) relational wellbeing (i.e., social and political situation, social interactions and the norms that govern society); and 3) subjective wellbeing (i.e., psychological situation, cultural values, ideologies, beliefs and people's perceptions of their situation) (White, 2009b, p. 10) (see Chap 2.3). When questioned about wellbeing during the semi-structured interview process, participants gave answers that were categorized as items required to "have" a good life (i.e., tangible material wellbeing) and qualities required to "live" good life (i.e., intangible relational and subjective wellbeing) (Table 6.1). Written questionnaires were employed to tease out the impacts of specific and individual facets of social wellbeing gleaned from interview and focus group data. In this chapter, I unpack and examine social wellbeing in Bluefields by drawing from interviews and supplementing this qualitative insight with descriptive quantitative questionnaire data (see Chapter 4 for methods).

**Table 6.1 Dimensions and facets of social wellbeing.**

| Wellbeing Dimensions (White, 2009b) | Facets (Coulthard et al., 2011; Weeratunge et al., 2014, p. 13; White, 2009b) | % of interviews |
|---|---|---|
| Material (Sec 6.1) | Livelihood diversity (Sec 6.1.1) | 93 |
| | Assets (Sec 6.1.2) | 93 |
| | Access to primary resources (Sec 6.1.3) | 67 |
| Relational (Sec 6.2) | Social relations (Sec 6.2.1) | 100 |
| | Fisher institutions (Sec 6.2.2) | 81 |
| Subjective (Sec 6.3) | Self-identity (Sec 6.3.1) | 98 |
| | Living right (Sec 6.3.2) | 60 |
| | Satisfaction (Sec 6.3.3) | 52 |
| | Autonomy (Sec 6.3.4) | 50 |

## 6.1 Material Wellbeing

Material wellbeing describes the basic materials for a good life (White, 2009b). Based on the results of coding semi-structured interview data and review available literature, material wellbeing was disaggregated into three components for analysis (Weeratunge et al., 2014; White, 2009b):

1) Livelihood diversity
   a) Primary and alternative livelihoods options
   b) Education
   c) Physical health
2) Assets
   a) Fishing gear
   b) Shelter
   c) Other assets (e.g., boat, motorbike, television)
3) Access to primary resources (e.g., fish, water)

I elaborate on these facets of material wellbeing in the following subsections.

### 6.1.1 Livelihood Diversity

Wellbeing "builds on and advances livelihood approaches" (for examples of livelihood approaches, see Allison & Ellis, 2001; Carney, 2003; de Haan & Zoomers, 2005; Hoon & Hyden, 2003; Scoones, 2009). Livelihood is an all-encompassing term that describes "people's

economic activity as a complex mix of priorities, strategies, influences, activities and alliances [drawing] on a range of material and social resources" (White, 2009b, p. 3).  Similarly, Ellis (2000, p. 10 as cited in Allison & Ellis, 2001) defined livelihood as "the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household".  While the SW framework considers elements outside of the livelihood approach, livelihood is incorporated as a facet of material wellbeing (Weeratunge et al., 2014).  For this research, parameters of livelihood will be the resources (e.g., education, skills, health) and activities (e.g., primary, alternatives) that people use to pursue material wellbeing.  In Bluefields, community members expressed the following livelihood factors as particularly important:

   a) Primary and alternative livelihoods options;
   b) Education; and
   c) Physical health.

I discuss these livelihood factors next.

### 6.1.1.1 *Primary and Alternative Livelihood Activities*

Fishing is the primary livelihood activity for the majority of surveyed fishers in Bluefields—57% of questionnaire respondents stated that fishing makes up more than 50% of their monthly income (n=77 fishers).  In particular, fishers look to the sea for immediate economic returns, as indicated by one fisher and farmer,

> When you plant your own food, if it takes six months to come, it takes six
> months…The reason why I love [fishing] more is you don't have to wait
> on the fish; it's there all the time.  When you go to the sea and catch a fish,
> you cook a fish, you roast it, fry it, and make your soup.  Fishing is very
> fast, you can go out there every day.  If you go out there and plant every
> day, you won't get your food at the same time; so the sea is great. (37)

Therefore, for many community members, livelihoods are deeply bound to the availability of coastal-marine ecosystem services (e.g., fish, other sea life) (Chap 5.1).

While fish may be "there all the time" (37), weather conditions and catch size can be unpredictable and unreliable for some fishers.  One warden of the Bluefields Bay Special Fishery

Conservation Area (BBSFCA)—who is also a fisher—pointed to the uncertainty of relying on fishing for income:

> I [still fish] to make money, but it is less strenuous, I depend less on it; it is much easier for me. So, for instance, if I spend…JA$10000, and I go out there and only make JA$6000, I lose JA$4000. But because I have a salary [from being a warden] coming, I can make it up and go again. If I don't have a salary coming, I have to turn to the sea at night, you burn less gas, and you anchor and see if you can catch fish to make it up. It's kind of difficult. It is much harder when you solely depend on the sea. (5)

Along these lines, 71% of questionnaire respondents also engaged in alternative livelihood activities (n=77 fishers). Some of these alternative activities for fishers include: construction (e.g., carpentry, masonry, general construction work), farming, service work (e.g., shop keeping, restaurant work), and other work (e.g., entertainment, DJing, game warden) (Figure 6.1). Many people in Bluefields are also being employed by the tourism industry (e.g., servers, general hotel staff, lifeguards, security guards, Divemasters), which is an important cultural ES in the community (Chap 5.2).

However, while community-based tourism is growing, many people are forced to commute to the large-scale resorts of Whitehouse and Negril for work. The Bluefields People's Community Association (BPCA) is pushing for a transition towards local tourism as an alternative for fishers, although leaders have identified several barriers to growth of a larger community-based industry. For example, as one participant noted, "Fishers are not certified [for tourism], their vessels are also not certified [for tourism], and so as a result of this we cannot do all out marketing to bring clientele in" (19). Additionally, in certain districts (e.g., Paradise, Auldayr), the potential for tourism is limited by landscape (i.e., unappealing aesthetic for tourists) and infrastructure (e.g., hotels, roads). Outside of tourism, fishers lack the formal education required for conventional "9 to 5" jobs: "[The ocean] means everything to me you know, because I live off it. I don't have the education to get the work on land" (26). Thus, education is important for wellbeing and social mobility, but has become a limiting factor for many fishers who seek to fully transition to other livelihoods (Sec 6.1.1.2).
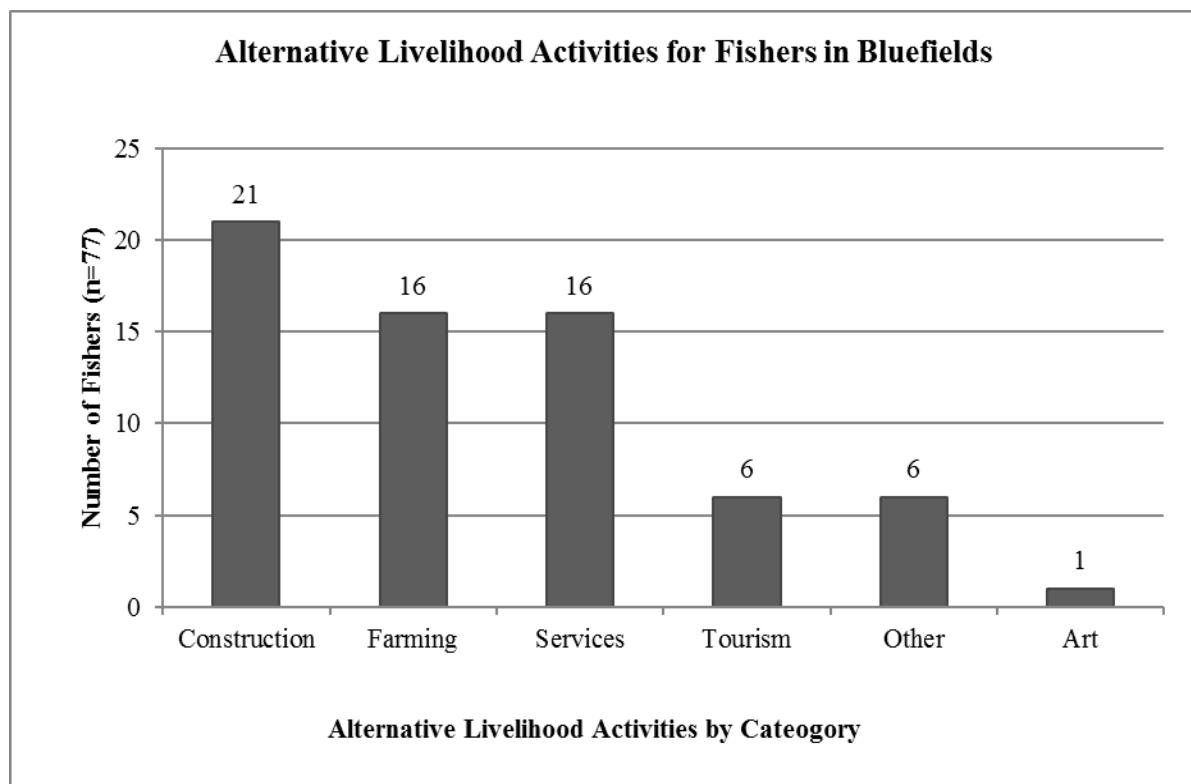
**Figure 6.1 Alternative livelihood activities for fishers in Bluefields.**

Previous studies have recognized the importance of fishers' livelihood diversification in successful "fishery exits" (i.e., abandoning fishing as a primary livelihood activity), and subsequently, in marine conservation progress (Daw et al., 2012; Johnson et al., 2013; Katikiro, 2016). However, there are challenges preventing access to alternative livelihoods in small-scale fishing communities, such as the absence of transitional funding and support programs—as is the case in Bluefields. External intervention and support (e.g., funding from NGOs) aimed at addressing these absences (see C-ARK in Chap 3.4.3) can result in tension and the inequitable distribution of benefits (Katikiro, 2016). Moreover, some authors suggest that alternative livelihoods may even be detrimental to marine conservation (Sievanen et al., 2005; Slater et al., 2013). For example, alternative incomes may only supplement or complement fishing, and consequently contribute to reinvestments that enhance fishing effort (e.g., in purchasing fishing gear, boat upgrades), leading to the continued unsustainable exploitation of coastal-marine fisheries (Sievanen et al., 2005). The accessibility of alternative livelihoods was discussed as a governance challenge in Chapter 3.4.3.

6.1.1.2 *Education*

When questioned about the top three requirements of a successful life, education emerged as the most important, chosen by 58% of questionnaire respondents (n=77 fishers) (Figure 6.2). However, many fishers and fishing families remain locked in a cycle of poverty that force them to abandon formal education at an early age:

> A good life is…you don't have to struggle; you don't have to be working that hard from a tender age.  Most of us had to stop school early just to [make money] for myself, and my family as well, because at one point I had to go to sea or do construction work, whatever, whatever, to support my mom. (22)

Others tried to juggle school and fishing at the same time:

> My father used to go out at night with the net so I could go to school the next morning…The thing about it is that I used to go to night sea so I could go to school. We would leave at 6 [pm] and come back at around 10 or 11 o'clock [pm] so I could get some sleep to go to school in the morning—that's if we made a good catch.  Sometimes I would have to do it straight until 2 or 3 o'clock [am]…And then I was expelled in the 11th grade.  I would come home, sit down, and have nothing to do.  I felt so embarrassed to know that every time my father did something to provide food, it was just him, and I wasn't doing anything.  So I was embarrassed, I said to him one day that I'm going to go to sea, because he and I already used to go and I couldn't go to school (42).

These stories illustrate that for fishers, both young and old, education may be out of reach: "Education gone long time for me" (25).  Still, people recognize that education offers hope for future generations.  When questioned about the ocean, many interview participants stated that provisioning ecosystem services "send" their children to school by providing the means to financially support their families.  In Jamaica, even public schools have fees (e.g., tuition, uniform, books, school supplies, lunch).  For an average Jamaican—who commonly has more than one child—these fees can be financially crippling:

> The school that my kid passed to go to…the bill came to JA$10500 to get them into the school.  And I gave my girlfriend, the first time she went up there, I gave her JA$4500, and she paid her [bus] fare out of it and then pay JA$4000 to the school as a down payment [for one child]—no, then they said they don't take that, she has to come with the full amount,

93

$10500, before the kids can attend the school. Do you believe that?
Yeah, someone like me, I don't have one kid, I have to pay $10500 for this
kid. Then I have another kid, she's an athlete, she does long jump and
100m, she does four events, she boards. So, I have to spend a lot of money
on her, you understand? (15) (N.B.: For reference, JA$10500 is CA$110)

Although the minimum legal wage in Jamaica increased from CA$1.45/hour to CA$1.60/hour in 2016 (MLSS Public Relations Unit, 2016), low-income families struggle to provide their children with the education required to lift them out of poverty (Clarke, 2015; Dasgupta, 1993).
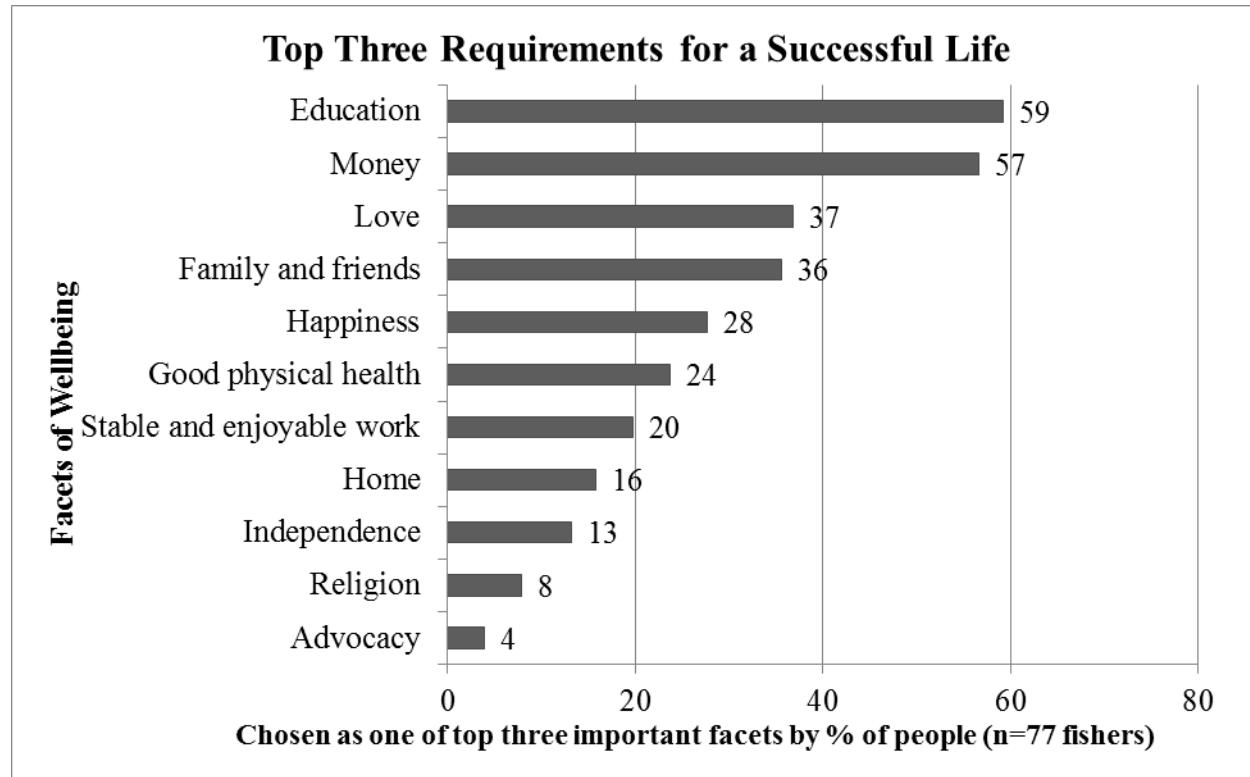


**Figure 6.2 Top three requirements for a successful as chosen by fishers in Bluefields.**

6.1.1.3 *Physical Health*

Without a formal education, some Jamaicans are forced into physically strenuous work. For these individuals, any major injury would result in a drastic livelihood reduction. For example, one spear fisher gave an anecdote about a missed job opportunity in Negril. He was hired by a hotel to lifeguard, but he first had to pay a formal lifeguarding certification fee (JA$5400 or CA$56). His only option was to "turn to the sea" (42) for this fee. Yet, shortly before he could

acquire the whole amount, he broke his toe in a motorcycle accident. He stopped fishing and was unable to pay the certification fee, and consequently lost the job opportunity. These stories of injury and livelihood impacts are unfortunately commonplace.

The physicality of fishing and the uncertainty of the coastal-marine environment (e.g., strong waves, sudden storms) produce many occupational hazards. Research has indicated that marine fishing is an inherently dangerous occupation (Novalbos et al., 2008; Percin et al., 2012; Udolisa et al., 2013; Zytoon, 2012). Common injuries for small-scale fishers include eye problems from sun glare (e.g., cataracts), punctures by fishhooks, cuts, bruises, bone fractures, finger amputations, and muscle tears (Percin et al., 2012). These injuries were reiterated by interview participants, particularly spear fishers: "He's not hearing so good. He's hard of hearing—the sea deaf him" (28), or,

> Once I went spear shooting, down the bottom, and when I looked in the
> glass it was filled with blood because I went too deep. My goggles [were
> full of blood]….I tried not to panic. I just got up out of the water, took off
> the goggles, and just stayed there for a while. Then I put [the goggles]
> back on and realized that it had stopped. (39)

Spear fishers have also reported an increase in physical harm since the implementation of the BBSFCA, since they are forced to diver deeper and swim farther (see Sec 7.3.1). Regardless of occupation, good physical health is regarded as important for all, as summarized by one non-fisher, "If you have a lot of money, all the money you can have, and you don't have health, you are still poor, I think. You cannot enjoy the money that you have because you don't have good health" (5).

## 6.1.2 Assets

Regarding the tangible material possessions needed for a good life, participants reported the following items:

a) Fishing vessel and gear;

b) Shelter; and

c) Other assets (e.g., boat, motorbike, television).

I describe these key assets for community members next.

6.1.2.1 *Fishing vessel and gear*

In Bluefields, fishers employ a variety of fishing methods using a variety of equipment and tools (Table 6.2). However, regardless of fishing method, the importance of a reliable and powerful fishing vessel is widely recognized:

> Many of the fishermen aren't fishing that much again because they are impeded. They can't fish…not everyone uses an engine boat, some use canoes…not everyone has an engine boat to go far. [They stopped because] they said their livelihood isn't so bright. (29)

For offshore fishers, having a good engine can be a matter of life and death: "If you don't have a good engine, and [your engine] goes, and you drift away, you will lose your life" (37). For inshore fishers, ownership of an engine boat would mean the ability to fish "in the deep". With the implementation of the fish sanctuary and the overfished inshore environment, the opportunity to fish offshore would provide inshore fishers with an added level of financial security. For the same reasons, inshore fishers with engine boats dreamed of owning larger boats with better engines, and other fishers wanted to own a boat for independence.

**Table 6.2 Comparison of vessel and gear type between national licenses (CARICOM, 2000, p. 18) and surveyed fishers in Bluefields (n=77 fishers).**

| Vessel Type | National # | Surveyed # |
|---|---|---|
| None | 19 | 8 |
| Shared | N/A | 33 |
| Canoe (fibreglass, wood) | 2963 | 14 |
| Engine | 50 | 22 |
| **Fishing Method and Gear Type** | | |
| Mixed (multiple gear types) | 2510 | 63 |
| Line (trolling line) | 253 | 3 |
| Net (China net, sprat net) | 188 | 1 |
| Pot (Antillean Z trap) | N/A | 1 |
| Freelung (spear gun) | 38 | 8 |

Questionnaire results revealed that 43% of surveyed fishers share their boat with other fishers (n=77 fishers) (Table 2). During interviews, many participants stated that they simply could not afford their own boat, or that sharing a boat with a family member would help to offset

costs. Further, offshore fishing is primarily a combined effort, with two to three fishers working together (CARICOM, 2000). In most situations, the captain of the boat (i.e., the owner) will take a larger share of the catch than other members. One fisher said, "Owning a boat, don't have to go with any bigger heads" (14), suggesting that an unfair division of profit can lead to a decline in relational wellbeing and a range of conflicts between fishers. However, while fishers believe that offshore environments provide economic promise, shifting fishing pressure from inshore to offshore is not a sustainable solution. Assessments of offshore fisheries suggest that these fish stocks, like inshore fisheries, are overexploited or severely depleted (CARICOM, 2000).

### 6.1.2.2 *Shelter*

Shelter is a necessity of life. In Bluefields, having a house is synonymous with a good life, and fishing has provided the means for fishers to own one: "I've built a house and I owned a boat from the ocean" (2); "Well, most of what I have, I made it from the sea—my furniture in my house and so forth" (8); or "[The ocean] gives we all that we got—house—everything" (14). Having a house is also the basis for certain aspects of relational wellbeing (Sec 6.2): "You can't have a family without a home" (25).

### 6.1.2.3 *Other Assets*

In addition to necessities, some participants expressed the desire for "other things" (25), such as: clothing, televisions, blenders and kitchen appliances, cellular phones, motorbikes, and cars. While these items may improve material quality of life, some authors have suggested that they are also important in Jamaican culture as symbols of status (Batson-Savage, 2007; Hope, 2004). As such, additional assets may enhance both relational and subjective wellbeing (discussed later). For example, one young male fisher mentioned the importance of having nice clothes and a nice cellular phone when going out to social events (e.g., dancehall night clubs). He stated that owning nice things gave him confidence and garnered him more respect from his peers.

## 6.1.3 Access to Primary Resources

Food and access to clean water are universally recognized as necessities. Certain staple foods— such as yam, plantain, and cassava—are ubiquitous in the Jamaican environment. Another

popular national food is breadfruit (*Artocarpus altilis*), which grows readily on trees found all over the island.  In fact, urban legends tell that the very first breadfruit tree in Jamaica was planted near Bluefields Beach Park (Participant 44, personal communication, Sep 5, 2015).  Despite originating from colonialism and slavery, breadfruit remains highly celebrated in Jamaican culture (Higman, 2008).  One fisher sang praise of this fruit, concluding that people should eat less fish (for conservation purposes) and eat more breadfruit.  Breadfruit—boiled, fried, roasted, baked—is often a companion dish to a protein (typically fish, seafood, or chicken).  That said, fish and sea life are also an important protein source for the community and a key provisioning ecosystem service from the ocean (Chap 5.1).

Water is a concern for all districts in Bluefields, particularly those that are located uphill and far from the main road where water pumps and water pressure might be inadequate.  In Auldayr, for example, access to water from the main pipes is highly unpredictable due to elevation.  One individual from Auldayr used to collect water in large jugs from Bluefields and then carry the jugs home (5-minute bus ride and half hour walk uphill).  Water from the main pipes—when accessible—is usually sanitary and drinkable without treatment.  To meet water needs, the potential for the ocean to provide fresh water through desalination was discussed in Chapter 5.3.2, although issues such as water infrastructure would still need to be addressed.

## 6.2 Relational Wellbeing

In Jamaica, there is a proverb about relationships: "good friends better than pocket money".  Relationships permeate Jamaican life in every way (e.g., social, cultural, religious interactions).  In many situations, "payment" in social favour can even replace financial exchange (e.g., calling a friend or family member to do household repairs).  Therefore, maintaining a diversity of networks is important to Jamaicans: "They say no man is an island and no man stands alone, and so again, building relationships is very good" (1).  In fact, when surveyed, questionnaire respondents indicated that love, family, and friends were some of their topmost requirements for a successful life (Figure 6.2, above).  In this part of the chapter, I examine the tangible (e.g., the types of groups that people identify with) and intangible aspects (e.g., the values, beliefs, norms

that drive this identity) of relational wellbeing, disaggregated into the following subsections
(Britton & Coulthard, 2013; Weeratunge et al., 2014; White, 2009b):

1) Social relations
   a) Local community
   b) Close circle
   c) Family and household
2) Effectiveness of local fisher institutions
   a) Advocacy
   b) Trust

In the following subsections, I analyze multiple layers of relational wellbeing in Bluefields.

**6.2.1 Social Relations**

I begin this section by describing social relationships, starting from the community level, and
based on the "relational landscape" defined by Britton and Coulthard (2013) (Figure 6.3). This
understanding of the social fabric provides information about the social and institutional capacity
of MPA governance, a current challenge in Bluefields (see Chap 3.4.1).
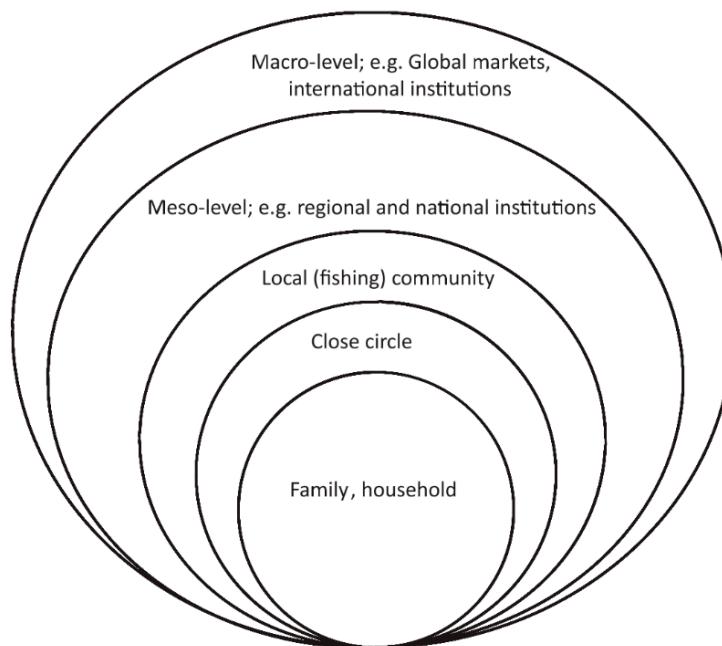


**Figure 6.3 The "relational landscape" of relational wellbeing** (Britton & Coulthard, 2013, p. 32)**.**

### 6.2.1.1 *Local Community*

Within a community, one individual can belong to multiple organizations and networks. Organizational belonging describes the religious groups, clubs, sports, political parties, gangs, and action groups that people belong to (White, 2009a). Membership in these groups may depend on multiple demographic and psychographic factors. In Bluefields, religions form important organizational groups (e.g., Seventh Day Adventist, Ethiopian Orthodox) (see Chap 5.2.6). For example, one individual described the crossover of employment opportunities provided by a religious network:

> A is also a member of the Ethiopian Orthodox Church, so is B, that's how
> I met them, through the church. A and I have worked together since then;
> he gave me my first job, so that relationship has been built over time. (1)

Identifying with certain groups can lead to actions that reflect the beliefs and characteristics of this group to maintain membership. Strategies to influence behavioural change, such as MPA compliance, may capitalize on appealing to social groups. For example, community-based social marketing (CBSM) has been referenced as a strategy by the Jamaican government to affect behavioural change surrounding protected areas (Brown & Edwards, 2005; UNDP & NEPA, 2011). The CBSM framework is based upon research suggesting that "behaviour change is most effectively achieved through initiatives delivered at the community level", and an element of this framework involves "seeking commitments in groups" (McKenzie-Mohr, n.d., p. 3). As such, identification of community groups, and the relational wellbeing they indicate, could inform MPA governance.

### 6.2.1.2 *Close Circle*

Social circles are complex, overlapping, and multi-faceted. Regarding two individuals that were referred to as both co-workers and friends, one warden said, "We share basically the same sentiments. I mean, they are people who truly love the environment and we share things in common. So, it makes it much easier to work and partner with them" (1). However, some community members have also suggested that social circles and relationships can lead to the inequitable distribution of opportunities and benefits:

Jamaica is difficult, you know, it's totally different.  You see in Jamaica here, it's like favouritism.  For instance, you have work and you're going to give someone, you're going to look for someone who is your friend, or someone is going to say, "I have a friend, you can make him do that." you know what I mean?  It's a favouritism thing. (6)

For example, regarding the sanctuary, one fisher said:

Well, yes. At first we could go into the sanctuary and make money.  When the weather was bad, you would find a lot of fish in there, but because we can't go in there now…well, men [still] go in there you know?  Not every man.  Even the sanctuary has men who if they see their friends, they will let them in, but other people, they will run them out, send out and call the police on them, that's how they are….[Authorities] are unfair, they shouldn't allow anyone to go in there at all.  I'm not upset with the men they allow in there….If I got the chance to go in there, I would go. (27)

These statements imply that management (e.g., enforcement of MPA rules) may be inconsistent, or at the very least, perceived as inconsistent by some fishers (more in Chap 8.2.2).  While social circles in Bluefields can lead to both beneficial personal and professional outcomes, these relationships can also increase the level of conflict within communities, thereby hindering opportunities for meaningful collaboration and participation (Chap 8.2.3).

### 6.2.1.3 *Family and Household*

There is high degree of kinship between neighbours in Bluefields—so much so, that the meaning of "community" for some individuals may be synonymous with family.  One person can have innumerable extended family members (e.g., cousins, uncles) residing in the same district.  Commonly, many people living within a certain distance will share the same last name.  For fishing communities, fishing muddies the distinction between family and business.  Fishing is often a family affair, where family members work together to achieve common goals.  In Bluefields, 49% of fishers fish with other family members (Figure 6.4).  Although families are not immune to conflict over profit inequities, for the most part, they share in both despair and success together.  Even on days with zero catch, one fishing couple said they never quarrel: "We just sit down…and say that is how life goes—think about the next day" (26).
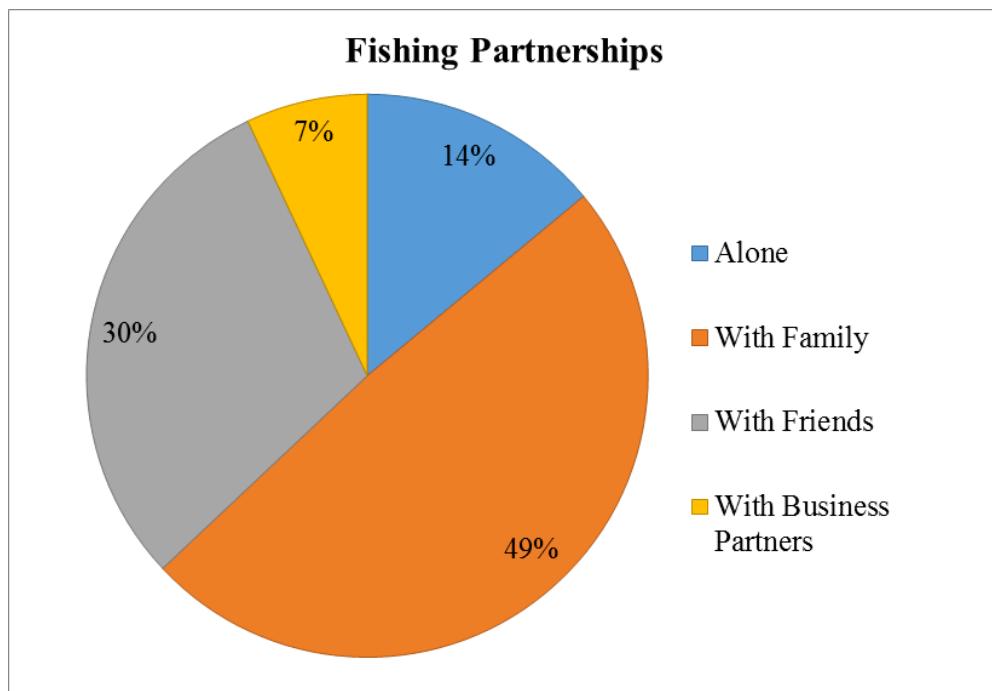
**Figure 6.4 Fishing partnerships in Bluefields (n=77 fishers).**

With the close geospatial proximity of most family members, family connectedness is a central part of daily life in Bluefields. In Jamaica, particularly in less developed communities, blended families are common. Households can have single mothers with children fathered by different men, or vice versa. One participant wistfully discussed the qualities of a traditional nuclear family that he longed for in childhood:

> My father wasn't there, so it was just my mom and I. So, I think I would classify a good life....I don't think that I have experienced a good life. I think my life has been average, what the average Jamaican would experience. I think a good life would be what the upper-class people experience….Those people who have mom and dad around them. (22)

Relationships are a key contributor to quality of life, with 36% of surveyed fishers choosing "family and friends" as one of their top three requirements to lead a successful life (n=77 fishers) (Figure 6.2, above). Since familial fishing partnerships are commonplace, fishing must be viewed as more than just a livelihood activity, but also as a social cornerstone in the community. MPA governance processes that recognize this relational aspect of small-scale fisheries may achieve greater conservation success (Chapter 8).

## 6.2.2 Effectiveness of Local Institutions

An institution is the "cluster of rights, rules, and decision-making procedures that gives rise to a social practice, assigns roles to participants in the practice, and guides interactions among occupants of these roles" (Young et al., 2008, p. xxii). Tangible properties of institutions within fisheries might include "families, firms, communities, social networks, government organization, research institutes, government agencies and legislative bodies" (Jentoft, 2004, p. 138). Less tangible properties of fisheries institutions, on the other hand, might include the "values, preferences, rights, norms, guidance, warnings, standards, perspectives, language and meaning" that tie an individual to a society (Jentoft, 2004, p. 138). These properties reflect White's (2009b) description of relational wellbeing as "the rules and practices that govern 'who gets what and why'". In this section, I examine how advocacy and trust tie individuals to local institutions, and how these ties provide answers for "who gets what and why"—a current source of conflict in Bluefields (Chapter 7).

### 6.2.2.1 *Advocacy*

Despite the longstanding presence of a community development group and fishing society to represent the interests of Bluefields, some fishers feel alienated and unrepresented in the community: "Society people is not for you, it's for they. Do you understand what I'm saying? It's not for you, nor me, nor her, nor others. They look out for the bigger people, and the smaller ones suffer'' (37). Beyond feeling alienated and unrepresented, some fishers feel maliciously targeted. Several fishers from districts outside of Belmont also mentioned stories of being unfairly treated by the BBFFS. One fisher shared,

> Because even the people who are working at the sanctuary, when they see
> we out there they harass we and they tell [a] lie on us out there. Because
> they put up some poles [the markers] out there and when they put up some
> poles they don't put them up in the right way, [and they drift away], and
> when we come they tell lies that it's fishermen that cut them off. And
> anywhere they see us now they harass us, say it's fishermen that's in the
> sanctuary. Even when we're not in there, they say we're in there. We
> only want to be close to it. (26)

Another said,

> I went to court over it the other day. They thought I was in the sanctuary….The police came and said we were in there….When they realized they had nothing because we weren't in there, we showed them the mark, and they had nothing, we caught a lobster that weighed around a pound, and they charged us for an undersized lobster instead. Those lobsters can be caught in lobster season. But because they had nothing on us, we showed them that we were not within the boundaries, they decided they were going to pin something on us….We went to court and they charged us JA\$8,000 each….They still took away the lobsters and didn't give it to us, either. (27)

Moreover, the benefits distributed by both the BPCA and the Bluefields Bay Fishermen's Friendly Society (BBFFS) (e.g., job opportunities, rolls of fishing wire, boats and homes from Food for the Poor) are given to active participants in community development, and other members within these extended networks (more in Chap 8.2.4). Thus, the alienation of certain groups and lack of participation perpetuates itself. During a focus group in Black's Bay, fishers announced that they wanted to form their own fishing society to better represent their needs, but lacked the know-how, literacy, and organizational skills to initiate the process. The splintering between groups highlights a lack of social cohesion, which currently inhibits communication and participation in MPA governance (Chap 8.2.3).

### 6.2.2.2 *Trust*

One community leader believed that the problem with boat and fishing gear access was not a lack of material resources, but rather, a lack of relational trust between fishers. He referred to this distrust as a "residue of slavery" (19), a period when slaves were forced to turn on one another. As summarized by one fisher,

> We cannot trust people now today. To be confident is another way because at this time you're speaking to me you may be writing some statement, but as soon as you gone behind my back you change your statement to another thing. (16)

Distrust presents a barrier to the formation of fishing cooperatives (i.e., collaboration along a horizontal scale)—a missed opportunity for fishers to organize the sharing of equipment and labour. Stories of unfair distribution of profit and dishonesty are rife in the community, and alliances between fishers are constantly shifting. Moreover, older generations have expressed

concern over the younger generation's desire to make "the quick (dishonest) buck". For instance, one man in the community grew too old to fish and began loaning his equipment to a younger man in exchange for a share of the profits. He gave an account of his dismay:

> [The young man] was on the beach, and you know what he did? He went somewhere else and sold the fish and came back to tell me he didn't catch any. And someone came and told me it's not true, because he saw him on the beach selling fish somewhere else.

This anecdote is a small window into the conflicts that take place within Bluefields, but is a symptom of the larger institutional problems that have led to the breakdown of trust and integrity between community members.

The lack of trust, particularly in authority, is further reflected in the "informer fi dead" (informer for dead) mentality ("DPP urges J'cans to rise above 'informer fi dead' culture," 2014, "Time to rid country of 'informer fi dead' culture - Mayor Harris," 2014). When questioned about whether they would report illegal fishing, one person said: "It depends. If my life would be at risk, then I wouldn't do it, but if my life isn't at risk then I would do it" (24). Consequently, different social and organizational groups become self-contained silos of information that, in turn, inhibit the vertical transfer of knowledge (e.g., between communities and local authorities and government agencies). When asked if there was anyone that they trusted to speak with about the sanctuary, only one interviewee responded with a person in government, all others either said they trusted no one, or chose a member of the community within their close circle.

## 6.3 Subjective Wellbeing

Subjective wellbeing informs how one perceives the world, and therefore is a thread through all aspects of life—including both material and relational wellbeing. For example, while a quantity of money is objective, satisfaction with this money is entirely subjective. The importance of subjective wellbeing is recognized by White (2009b) as the apex of social wellbeing. In this section, I examine the following components of subjective wellbeing in Bluefields:

1) Self-identity;
2) Living right;

3) Satisfaction; and

4) Autonomy.

These components were selected based on the results of interview analysis, and were later cross-referenced with literature on social wellbeing (Weeratunge et al., 2014; White, 2009a).

### 6.3.1 Self-Identity

Social identity (i.e., the characteristics of one's identity in a social context) is normally a constituent of relational wellbeing. However, self-identity (i.e., continuous awareness of who you are) is also integral to understanding how people perceive and experience life (White, 2009b; Ellemers et al., 2002). Research illustrates that even in the presence of other livelihoods, fishing comprises the core of a fisher's identity (Weeratunge et al., 2014). Fishing is not just a matter of what fishers do, but also forms the substance for who they are—as one fisher declared, "[fishing] is in our blood" (25). Along these lines, the outcome of a day's work can have a huge impact on social and self-perception. One fisher described feelings of pride in receiving applause from his peers:

> It has an effect of idolism, whenever I catch a big fish they look at me as a hero. "What, tough shooter! You caught a big fish. Boss!" They give many compliments. Or if I make a deep dive to help out one of the other divers or make a big catch…they give me props for it and clap. (42)

Alternatively, bad days translate into failure and foreboding:

> Sometimes I get a bad feeling; I don't want to go out because nothing is going to go on today…I'm not going to make any money today. I'm just chilling. I'm not going to kill myself today. Because sometimes you go out Monday, nothing is going on, you come in with 3lbs of fish; you go out Tuesday, you come back with 3lbs of fish; Wednesday, you come in with 4lbs; so Thursday, we just say bad feelings today, we're not going to get anything. (15)

Further, experiences collected over the years can leave an impression for life. One fisher tearfully shared a painful story of a near-death experience: "We broke down, the engine burn out of gas and drift, drift two…three weeks—[only] one week we had food for, and one of the youth drop out, dump [him] overboard" (9). Although non-fishers may have less emotional memories

106

of the ocean, they still indicated a strong affinity towards it: "I grew up with the ocean. I am living not very far from the ocean. So that's where I used to spend all me summers, at the beach. And I grew to love the beach a lot" (5). Subsequently, while the degree of influence and sentiment may vary, the ocean plays a major reflection of self-identity. As such, convincing fishers to transition to new livelihoods may require more than just the provision of alternative livelihood opportunities, but also strategies to mitigate the devastating impacts of identity loss.

**6.3.2 Living Right**

During discussion about the components of a "good life", many interview participants brought up aspects of living right: "Live right among your fellow men, man—brethren and sistren" (3). In Bluefields, the concept of "living right" involves living a life of virtue, or as described by one fisher, "good heart, good ways" (11). For some community members, religion is an important pillar of virtue that impacts both decision-making and relational wellbeing:

> I became a Christian at the age of 25, and because of that, I was looked
> upon as a good person in the community, in the church, and all around that
> I have gone…And maybe earlier I would do things that people [would
> look down on], but because of Christianity, I think otherwise. (2)

In addition to being virtuous, living right also incorporates elements of *buena onda*, described by Copestake and Camfield (2009) as "having a resilient positive attitude towards life". *Buena onda* values good mood, optimism, enthusiasm, and "looking for the positive side of things" (p. 22), and is characterised by traits like flexibility and generosity. The importance of generosity was a recurring theme during interviews:

> I give to people, and I see to it that they are okay. You have to love
> people; you take from the ocean and you share, that's how we live. We
> take from the ocean and we share with one another. (11)

Again, religion is an inadvertent contributor to *buena onda* in Bluefields. In times of despair, some individuals turn to their faith for optimism: "Well, the Father gives me strength every day to keep on with work" (18). Others responded with the appreciation they had for life despite personal struggles: "When you do your fishing, you know that anything you get, you give thanks [to God] and praise, even if you get nothing, you still give thanks and praise" (31); or,

"Well, my living right now is just to praise God you know?  Quality of life is just to praise God, because if you have life, you have to praise God" (38).  Much like the case with self-identity (Sec 6.3.1), the MPA in Bluefields inhibits fishers' abilities to live right.  Some fishers are being forced to make morally compromising decisions (e.g., fish illegally in the sanctuary), while others are losing their optimism and enthusiasm for work.  These negative impacts represent barriers to effective governance of the BBSFCA (Chapter 8).

### 6.3.3 Satisfaction

Previous research has illustrated that life satisfaction and wellbeing are linked, with some authors using subjective wellbeing and life satisfaction synonymously (Copestake & Camfield, 2009; White, 2009a).  For example, Copestake and Camfield (2009) defined subjective wellbeing as "personal satisfaction with [the] achievement of life goals" (p. 5).  Other authors, such as Weeratunge et al. (2014), incorporate satisfaction as a facet of subjective wellbeing.  This research supports the notion that satisfaction is part and parcel to subjective wellbeing, but will respect the distinction between these two terms.  When asked about whether fishing provided the life they wanted, 72% of fishers in questionnaires responded yes (n=77 fishers).  However, during interviews, participants in the community indicated several regrets in life.  For fishers, one of these regrets included not being able to attend school (Sec 6.1.1.2) or enjoy a childhood: "I was forced to become a man before I could be a child" (42).  For non-fishers with a more traditional job, this meant time away from family: "I would love to have more time to spend with my children, but I spend more time [at work] than what I would spend at home or with my children" (4).  Perhaps the same person captured this dichotomy best when she said, "Well, you can't have everything, every time" (4).  Thus, while fishers indicated in their questionnaires that they were satisfied with their lives overall, the interview data highlighted some contrasting tensions and specific areas of "satisfaction gaps" that could impact governance processes.

### 6.3.4 Autonomy

The importance of autonomy and independence for fishers' wellbeing has been explored by other researchers (see Britton & Coulthard, 2013; Trimble & Johnson, 2013; Weeratunge et al., 2014).  Small-scale fishers lead independent lives, since they are usually self-employed.  However,

income earned from fishing is often unstable and unpredictable, depending on factors such as weather, catch, and resources expended for effort. In Bluefields, stable work (e.g., office work) is a constant that is paradoxically comforting and constricting: "A good life would probably be like you have a 9 to 5 where you earn money from whatever company" (22); versus "A happy man fishing—no boss. I'm self-employed—no boss—I don't like too much boss" (10). Many fishers enjoy fishing because of this autonomy: "Well, I'm self-employed and if you want to stay home for a day or two you can stay home. And you don't have anybody to quarrel on you for work" (17); or "It's an independent life. I wouldn't do any other work besides fishing" (29).

Correspondingly, non-fishers also noted the value of independence in living a good life: "When you're important you don't really have to go to anybody for anything—you're self-reliant—everything" (23); or "Good quality of life is where you can afford the basic amenities; meaning that you can provide for yourself independently without having to rely on somebody else" (1). In having autonomy, fishers can achieve one valued aspect of subjective wellbeing. Barriers to autonomy and the ability to live independently—for example, the MPA—may therefore lead to points of contention (Chap 3.4.2). MPA leaders must acknowledge that the sanctuary is not just about fish (i.e., material wellbeing), but also that its impacts are deeply social and psychological (e.g., feelings of failure from the erosion of fishers' self-reliance).

## 6.4 Chapter Summary

In this chapter, I examined the three dimensions of social wellbeing in Bluefields: 1) material wellbeing (e.g., livelihood diversity, assets, access to primary resources) (Sec 6.1); 2) relational wellbeing (e.g., social relations, fisher institutions) (Sec 6.2); and 3) subjective wellbeing (e.g., self-identity, living right, satisfaction, autonomy) (Sec 6.3) (Table 6.1). Through analysis of these three dimensions, I have indicated how governance processes must recognize the BBSFCA as more than just a protected area for fish and natural resources. The BBSFCA—or rather, the area of the sea that encompasses this sanctuary—represents a complexity of human interactions and exerts great influence over the social wellbeing of many community members. In the following chapter, I synthesize the findings of this research on ecosystem services (Chapter 5) and social wellbeing using the conceptual framework presented in Chapter 2.

# Chapter 7

# Ecosystem Services and Social Wellbeing Linkages

In this chapter, I synthesize results from Chapter 5 and Chapter 6 to analyze the linkages between ecosystem services and social wellbeing in Bluefields.  I begin the chapter by reviewing the conceptual framework presented in Chapter 2.4.  Then, drawing from focus group data, I introduce and compare broad ES-SW linkages for fishers and non-fishers.  Finally, using interview data, I apply my conceptual framework to examine specific ES-SW linkages for each community group.  Following the exploration of these linkages, I examine how the Bluefields Bay Special Fishery Conservation Area (BBSFCA) has changed access to certain ES bundles (Chap 5.5), and how this change in access has impacted social wellbeing.  The examination of the relationship between the BBSFCA and ES-SW linkages corresponds with objectives two and three, while setting the foundation for objective four of this research (Box 7.1).

**Box 7.1 Review of research objectives.**

> 1) Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);
> 2) **Define how a marine protected area (MPA) has changed access to these bundles for each group;**
> 3) **Examine how changes in access to these bundles have affected social wellbeing (SW) (i.e., material, subjective, and relational wellbeing);** and
> 4) Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).

## 7.1 Conceptual Framework Validation

The conceptual framework (CF) for this research—first introduced in Chapter 2 (Figure 2.4)—synthesizes ecosystem services (Chapter 5) and social wellbeing (Chapter 6).  In this conceptual framework, ecosystem services are depicted as a square to symbolize the interdependence of each ES category (i.e., provisioning, regulating, supporting, cultural).  Social wellbeing, also known as three-dimensional wellbeing, is accordingly represented in SW literature as a triangle, where each vertex corresponds to a dimension of SW (i.e., material, relational, subjective

110

wellbeing [WB]) (Britton & Coulthard, 2013; Weeratunge et al., 2014; White, 2009a, 2009b). Drawing from both these concepts, I developed my conceptual framework by embedding the "ecosystem services square" into the "social wellbeing triangle". Figure 7.1 is a revised version of the conceptual framework presented in Chapter 2. The primary components of the conceptual framework remain the same, but arrows have been added to illustrate the bidirectional influence and flow between each ES and SW component uncovered during data analysis (discussed later in this chapter). First described in Chapter 2, the orientation of the CF signifies an ecological apex (i.e., provisioning ES, regulating ES, supporting ES, material WB) and a social foundation (i.e., cultural ES, relational WB, supporting WB). In the following subsections, I deconstruct this conceptual framework and examine each component individually.
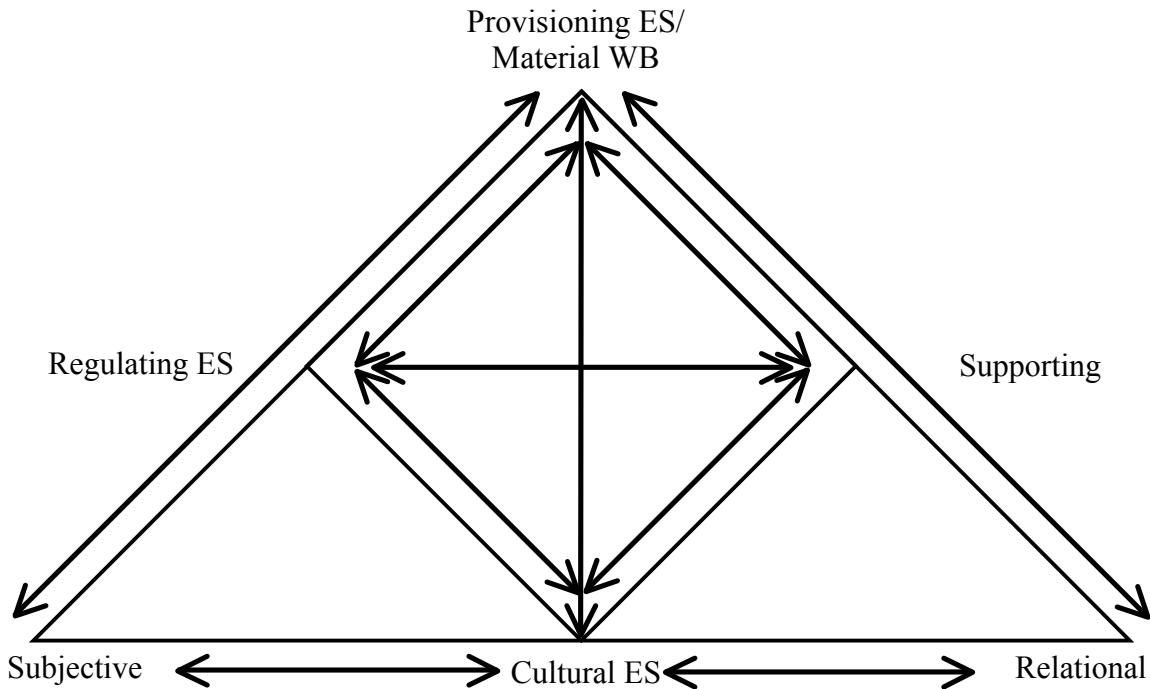


**Figure 7.1 The conceptual framework (CF) guiding this research analysis.**

### 7.1.1 Ecological Apex

The upper portion of the CF represents the ecological, material aspects of life (Figure 7.2). Provisioning services, defined as the "products obtained from ecosystems" (MA, 2005, p. 40), are the tangible benefits that people get from the ocean. In Bluefields, the most important of

111

these benefits is fish and sea life (including raw materials such as shells and coral) (see Chap 5.1 for more provisioning ES). Concurrently, fish and sea life, as provisioning ES, are a crucial contributor to material wellbeing for community members. While many fishers participate in alternative livelihood activities, fishing was the primary source of livelihood for 55% of questionnaire respondents (n=77 fishers) (see Chap 6.1.1 for livelihoods). As such, there is considerable overlap between availability of, and access to, provisioning ES and material wellbeing. Similar connections between provisioning ES and wellbeing were drawn by the Millennium Ecosystem Assessment, which identified the impact of provisioning ES on acquiring "basic material for good life" (MA, 2005, p. vi). Both provisioning ES and material wellbeing are buttressed by regulating ES (i.e., benefits obtained from the regulation of ecosystem processes) and supporting ES (i.e., services necessary for the production of other ES) (MA, 2005, p. 40), represented as the base of the ecological triangle. Regulating and supporting ES (see Chap 5.3 & 5.4 for examples) ensure the continued functioning of ecosystems and creation of ecosystem products.
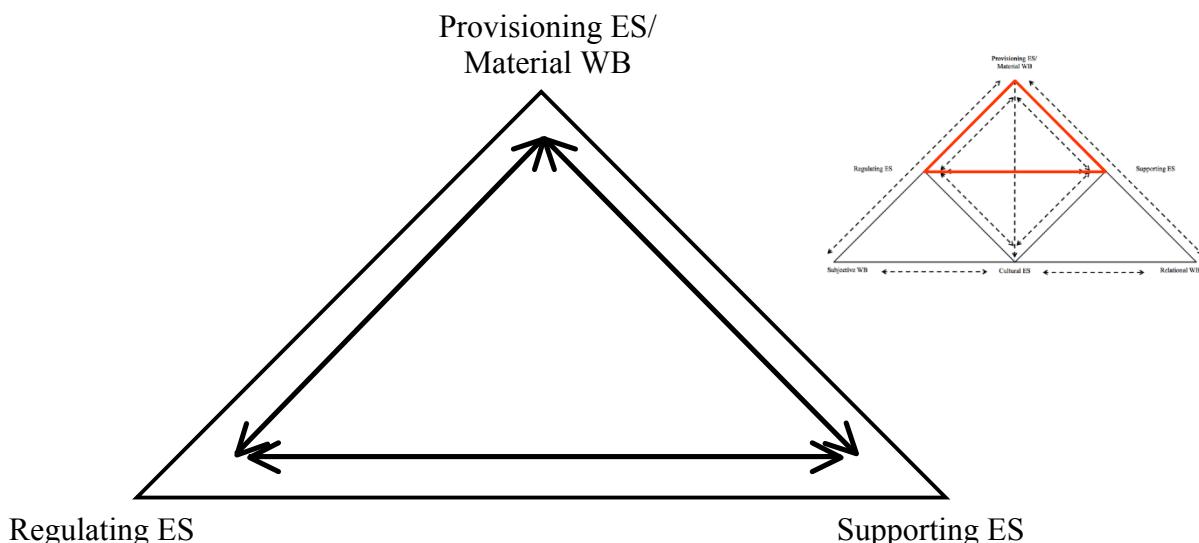


**Figure 7.2 The ecological, material portion of the CF.**

## 7.1.2 Ecosystem Service Bundles

In Chapter 5, I discussed the bundled qualities of ES in Bluefields, described as the unidirectional and/or bidirectional interactions between multiple ES (Bennett et al., 2009) (see

Figure 5.8 for summary).  Research has indicated that when prioritizing ES for conservation, relationships among multiple ES must be carefully accounted for (Bennett et al., 2009; Hamann et al., 2016; Klain et al., 2014; Renard et al., 2015).  Interactions between ES can lead to two outcomes: 1) trade-offs (i.e., where the increase of one or more ES results in the decrease of other ES); and 2) synergies (i.e., either an increase in multiple ES simultaneously, or a decrease in multiple ES simultaneously).  Therefore, the relegation of certain ES and ES categories into silos during conservation planning may result in unintended ES decline (Bennett et al., 2009).  The CF for this research acknowledges the "bundled qualities" of ES with bi-directional arrows, which also symbolize the bi-directionality of ES influence (Figure 7.3).
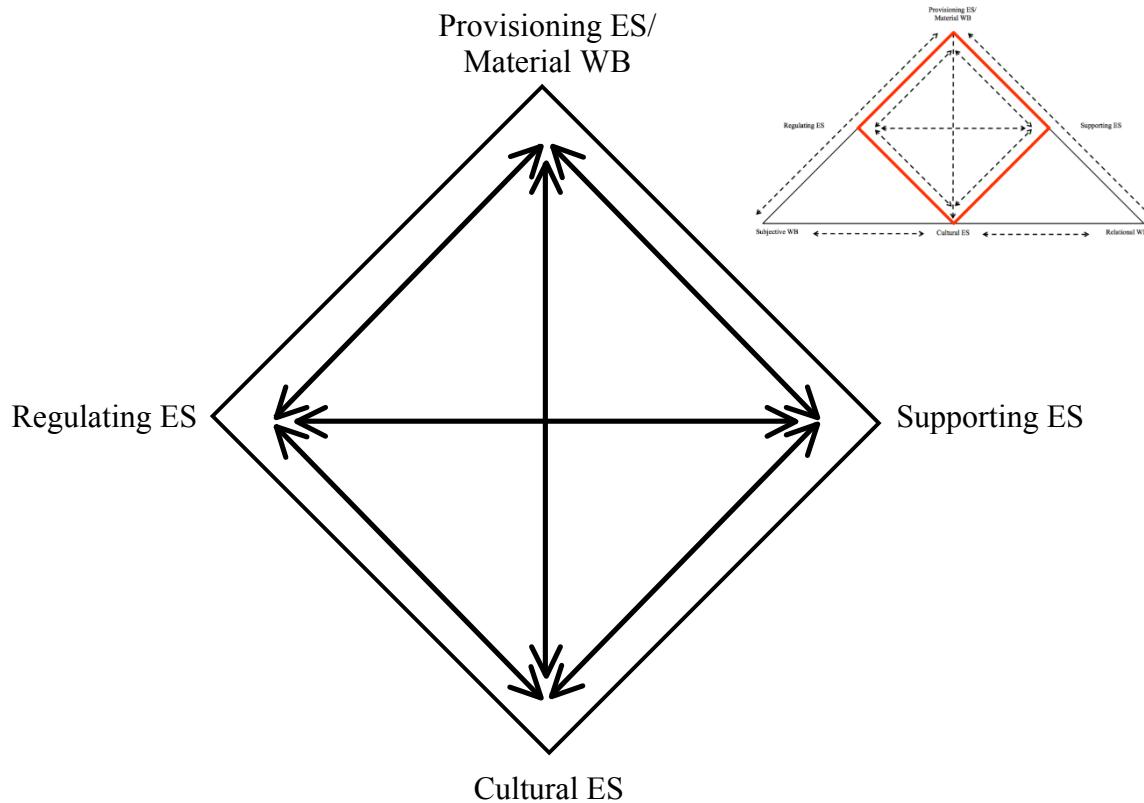


**Figure 7.3 The ES square and bundled qualities of ES.**

## 7.1.3 Social Foundation

The social foundation for this CF (Figure 7.4) comprises relational wellbeing (e.g., social interaction, socially determined rules, practices, and norms) (Chap 6.2), subjective wellbeing

113

(e.g., ideologies and beliefs that influence people's perceptions of their lives) (Chap 6.3), and cultural ES (i.e., the culturally significant intangible benefits that people obtain from ecosystems) (Chap 5.2) (MA, 2005; White, 2009b). I argued that cultural ES are central to both relational and subjective wellbeing, and that some cultural ES serve as the bridge between the individual (i.e., subjective self) and society (i.e., relational self). Findings from this thesis support this argument. In Bluefields, an example of a cultural ES bridge can be found in the cultural reverence of beaches and seascapes. Community members not only identify with seascapes on a subjective level (Chap 6.3), but also are relationally bonded through this shared identity (Chap 6.2). For fishers, this subjective and relational identity is amplified, since the sea is an important part of their self-perception (e.g., sense of identity, feelings of success, failure) and their ability to provide for their families (Chap 6.1) (e.g., food, shelter, education). Moreover, the subjective and relational ties formed through cultural ES can be synergistically self-enforcing. For example, access to certain cultural ES (e.g., recreation and leisure) can enhance relationships (i.e., relational wellbeing), in turn supporting components of subjective wellbeing, such as life satisfaction and happiness (Chap 6.3.3)—detrimental synergies can be observed in the reverse of this situation, where cultural ES cannot be accessed.
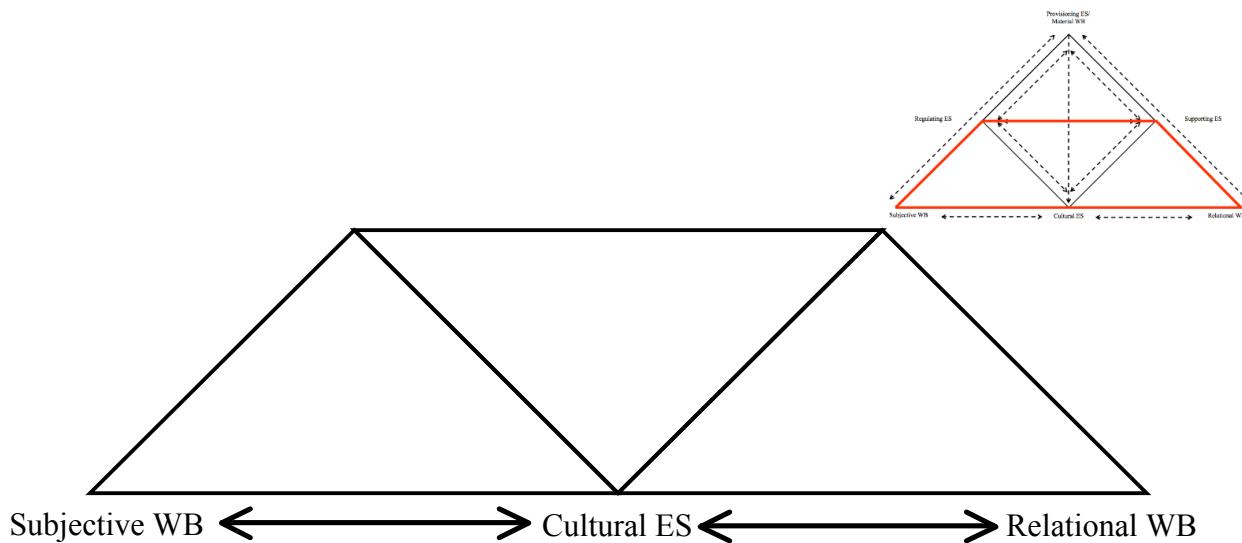


**Figure 7.4 The social foundation of the CF.**

114

## 7.1.4 Social and Ecological Orientation

The three dimensions of SW are connected through arrows in this CF, reflecting the impact of each dimension on the others. For example, many fishers expressed that a decline in access to provisioning ES, and therefore a decline in material wellbeing, can lead to declines in both subjective (e.g., feelings of failure, aspiration gaps) and relational wellbeing (e.g., arguments with family members), and vice versa. Ecosystem services remain a crucial aspect of wellbeing linkages in Bluefields, since provisioning ES are strongly tied to material WB, and cultural ES are central to subjective and relational WB. The bidirectional orientation of the connecting arrows illustrates that social components of a system can impact ecological components (e.g., stronger fisher institutions are better able to monitor MPAs), and further, that the reverse can also be true (e.g., deteriorating ecosystems can lead to conflict over resource scarcity).
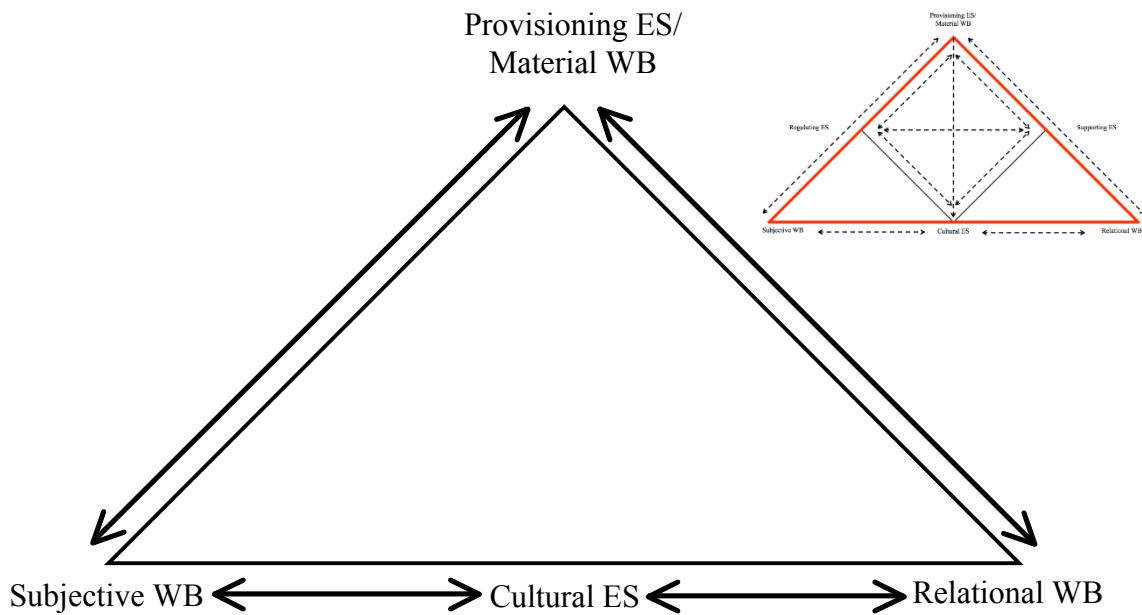


**Figure 7.5 Perimeter of the CF connecting the social foundation to the ecological apex.**

Insights from this research validate this conceptual framework by emphasizing the importance of strong social foundations in conservation efforts. The governance challenges identified in Chapter 3.4 (capacity, conflict, alternative livelihoods) all point to the crux of conservation issues in Bluefields: the human dimension. Chapter 8 will refine these challenges of the human dimension by applying the ES-SW linkages identified in this chapter, while also

exploring opportunities within these challenges to enhance MPA governance. This research proposes that without continued access to cultural ES and efforts to build robust levels of relational and subjective wellbeing, long-term conservation efforts to restore the "ecological apex" are unsustainable. Weakening of social foundations is exacerbated by the continued deterioration of this ecological apex, as conflict over resource scarcity is a known phenomenon (Pomeroy et al., 2007). The remainder of this chapter will examine the multi-faceted "human dimensional" issues of MPA governance in Bluefields. Ecosystem service and social wellbeing linkages will be explored for fishers and non-fishers. Then, the ES-SW conceptual framework will be applied through the perspectives of specific community groups (i.e., inshore fishers, offshore fishers, non-fishers) to examine changing linkages since MPA implementation.

## 7.2 Overview of Ecosystem Service and Social Wellbeing Linkages

In this section, I apply figures gleaned from focus group outputs (see methods Chap 4.5.2) to introduce broader ES-SW linkages for fishers and non-fishers. ES-SW linkages are highly complex in Bluefields. However, in examining synthesized focus group data (Figure 7.6), the linkage between fish and sea life (provisioning ES) and money, education and job (material wellbeing) is especially prominent. This finding validates previous results from interview and questionnaire data, which established the importance of fishing as a primary livelihood activity (see Chap 6.1.1.1). The synthesis figure further revealed that while a provisioning service emerged as the most important ecosystem service, community members thought of their "home" as more than just a material asset. Instead, "home" denotes a multi-faceted microcosm of social wellbeing. Elements of material wellbeing (food and water [Chap 6.1.3] and physical health [Chap 6.1.1.3]) were incorporated in their definitions of "home"—of note, two focus groups stressed the importance of water for life, and therefore felt there was a strong connection between water and home, which was a pointed emphasis not distinguished in interviews. Community members also noted the importance of family (part of the relational landscape [Chap 6.2.1.3]) and religion (a component of both relational [Chap 6.2.1.1] and subjective wellbeing [Chap 6.3.2]) in their idea of "home". These findings suggest that while provisioning ES may impact material being, the impact of ES access on the "home"—as a community social unit with

116

material, relational, and subjective components—must be acknowledged in MPA governance. Next, I discuss ES-SW linkages specific to fishers and non-fishers, using matrices described in Chapter 4.5.2.
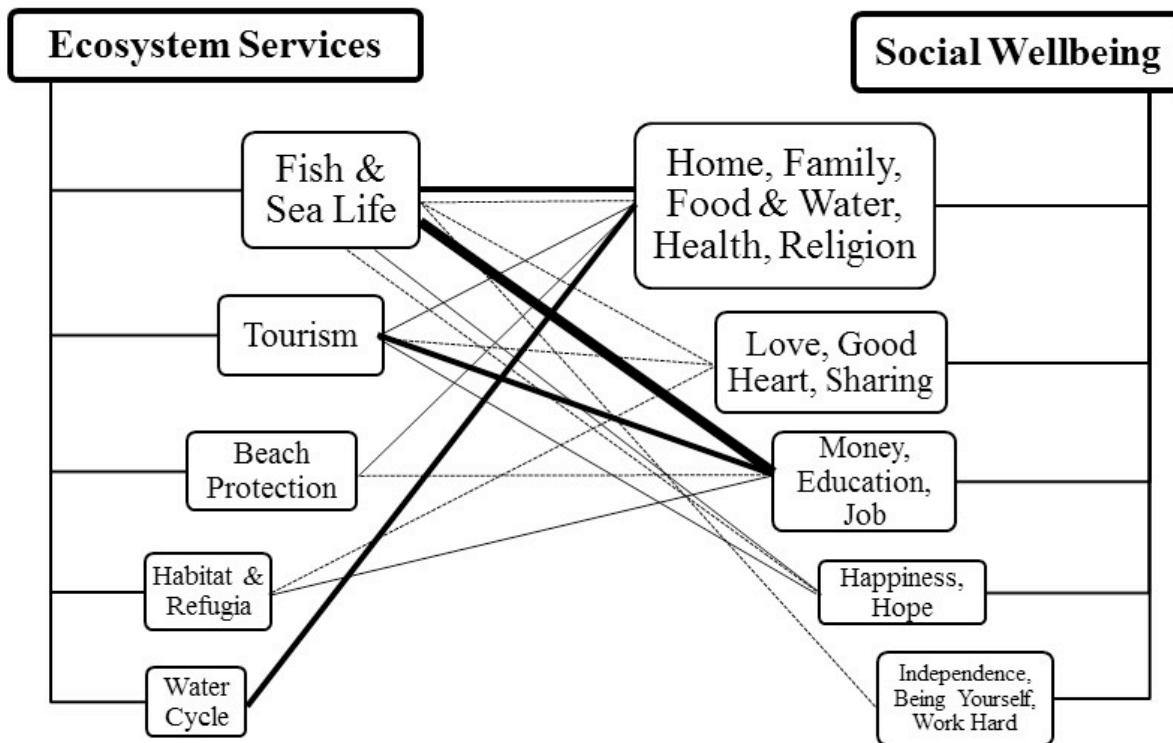


**Figure 7.6 Synthesis of focus group knowledge maps indicating the complexity of ES-SW linkages.**

**\*Thicker lines represent a stronger relationship.  Solid lines represent a unidirectional influence from ES→SW, whereas dotted lines represent a unidirectional influence from SW→ES**

### 7.2.1 ES-SW Linkages for Fishers

Initially, two focus groups were planned in both Paradise and Black's Bay (i.e., two in each district)—one for inshore fishers and one for offshore fishers.  However, due to unforeseen circumstances, focus groups in both Paradise (Figure 7.7) and Black's Bay (Figure 7.8) were amalgamated (see Chap 4.4 for reasons).  In these larger focus groups, the opinions of inshore fishers and offshore fishers are difficult to distinguish.  Furthermore, despite the two focus groups in Belmont being categorically "inshore" (Figure 7.9) and "offshore" (Figure 7.10), both focus groups were small.  There may be insufficient data to draw conclusions that are

representative of inshore and offshore fishers, distinctly.  Therefore, to avoid false inferences, I aggregate inshore fishers and offshore fishers together as "fishers" for comparison with non-fishers in this discussion.

*In each matrix, cell colour indicates the number of knowledge map connections (see Legends).  X indicates a specific ES-SW linkage made in the knowledge map.*

| | Happiness | Money | Food and water | Family | Religion | Health |
|---|---|---|---|---|---|---|
| Fish and sea life | | X | X | | | |
| Tourism | | X | | | | |
| Beach protection | X | | | | | |

Legend: 1 2 3 4 5+

**Figure 7.7 ES-SW matrix for Paradise fishers.**

| | Love, family | Health | Working hard | Money | Religion | Good heart |
|---|---|---|---|---|---|---|
| Fish and sea life | X | X | X | | | |
| Tourism | | | | X | | |
| Beach protection | | | X | | | |

Legend: 1 2 3 4 5+

**Figure 7.8 ES-SW matrix for Black's Bay fishers.**

| | Love, sharing | Family | Religion | Independence, working hard, be yourself | Home, food and water | Education |
|---|---|---|---|---|---|---|
| Fish and sea life | X | | | X | | |
| Tourism | X | | | | | |
| Habitat and refugia | | | | | | |

Legend: 1 2 3 4 5+

**Figure 7.9 ES-SW matrix for Belmont and Auldayr inshore fishers.**

| | Happiness | Home | Love, share | Food and water | Health | Work hard, provide for loved ones |
|---|---|---|---|---|---|---|
| Fish and sea life | | X | | | | X |
| Tourism | | X | | X | | X |
| Water cycle | | | | X | | |

| Legend | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5+ |

**Figure 7.10 ES-SW matrix for Belmont offshore fishers.**

Notably, the one commonality across all fisher focus groups is the acknowledgement of fish and sea life (a provisioning ES) and tourism (a cultural ES) as important for wellbeing. While the linkage between fish and material wellbeing has already been discussed, many focus groups also linked fish with home, love, family, working hard, and independence. For example, Belmont and Auldayr inshore fishers referred to fishing as a job that facilitated an independent life style. Belmont offshore fishers and Black's Bay fishers stated that fish allowed them to love and care for their families by working hard to provide for them. Another "provider" for families was the tourism industry. Fishers from Black's Bay, Paradise, and Belmont linked tourism with material wellbeing. For example, in Paradise, fishers noted that their family members worked in the tourism industry, which in turn provides money. Belmont offshore fishers noted that tourism allows them to "buy food and rum", as some of these participants were also involved in the tourism industry. Finally, Belmont and Auldayr's inshore fishers linked tourism with love and sharing, saying that love was required for sharing their community with tourists. However, as indicated in earlier chapters (Chap 5.2.5), this love is not universally present.

### 7.2.2 ES-SW Linkages for Non-Fishers

Non-fisher, in this thesis, refers primarily to non-fishing women (Figure 7.11) and wardens (Figure 7.12). While approximately four wardens were once fishers themselves, wardens no longer rely on fishing as their primary livelihood activity (see Chap 6.1.1.1). Some wardens continue to fish recreationally or for personal use. Wardens and women saw fish as less "multi-dimensional". For example, wardens linked fish with food and water, saying that they consumed

119

fish as food, while women linked fish with money and hope, saying that they hoped for more fish so the community could make more money. In addition, wardens were the only focus group to highlight sustainability as important for wellbeing. Wardens noted that it was important for the community to sustain tourism, and that they needed to protect the beach to achieve sustainability —some wardens referred to the beach and to coral reef interchangeably in this context.

| | Money, more things | Hope | Religion | Home, family, health | Love, good heart, share | Independence, be yourself |
|---|---|---|---|---|---|---|
| Fish and sea life | X | X | | | | |
| Habitat and refugia | X | | | | X | |
| Water cycle | | | | X | | |

Legend: 1 2 3 4 5+
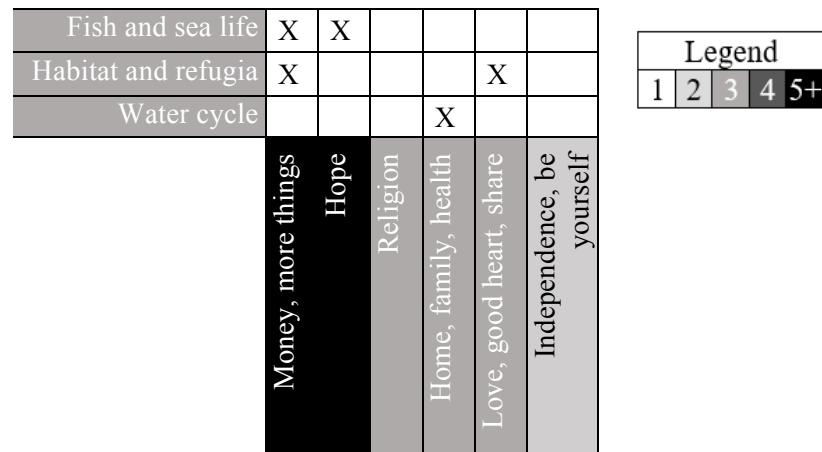
**Figure 7.11 ES-SW linkages for women.**

| | Education, job, money | Sustainability | Food and water | Family, home, religion | Happiness, hope | Love, share, good heart |
|---|---|---|---|---|---|---|
| Tourism | X | X | | | X | |
| Beach protection | X | X | | X | | |
| Fish and sea life | | | X | | | |

Legend: 1 2 3 4 5+
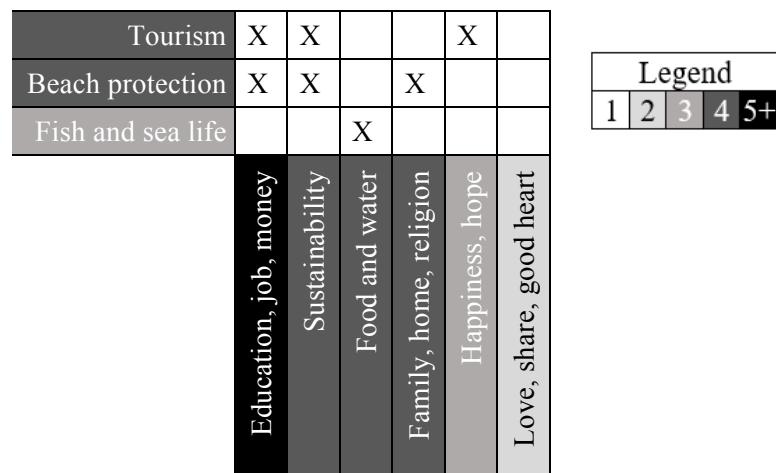
**Figure 7.12 ES-SW linkages for BBSFCA wardens.**

## 7.2.3 Comparing ES-SW Linkages Between Fishers and Non-Fishers

Fish and tourism are consistently ranked as first and second (based on the number of knowledge map connections) for fishers. Yet, for non-fishing women (Figure 7.11), fish has the same

knowledge map connectivity as supporting ES like water cycling and habitat and refugia.  For wardens (Figure 7.12), fish is the least connected ES component of their knowledge map, after tourism and protecting the beach.  Moreover, for wellbeing, all fisher groups acknowledged an intangible element of subjective wellbeing as central components of their knowledge maps.  For example, Paradise (Figure 7.7) and Belmont offshore fishers (Figure 7.10) both emphasized happiness, while Black's Bay (Figure 7.8) and Belmont and Auldayr inshore fishers (Figure 7.9) emphasized love.  Non-fisher focus groups, on the other hand, both chose money—a component of material wellbeing.  In reference to the conceptual framework for this research (more details in Sec 7.3), these findings support that fish and sea life, at the top of the ecological apex, has multi-dimensional impacts beyond the surficial impacts on material wellbeing.  Furthermore, these multi-dimensional impacts are especially relevant to fishers.

## 7.3 Changes in ES-SW Linkages Since MPA Implementation

The implementation of the Bluefields Bay Special Fishery Conservation Area has changed ES-SW linkages in Bluefields.  However, the extent and type of change (e.g., positive, negative) varies depending on fishing method, resource access (e.g., access to an engine boat), and geospatial location (i.e., district in which one resides).  In Chapter 2, I noted that the wellbeing concept originated from Hackbert's (1975) call to consider the "for whom" in policy analysis (Chap 2.3, p. 19).  In his pronouncement on wellbeing, Hackbert highlighted the importance of identity, community, and context-specific values in policy decision-making.  Building on previous discussions surrounding the importance of social foundations, this section highlights this "for whom" factor in the context of MPA governance in Bluefields.  I argue that sense of identity and community is strongly driven by geospatial boundaries and fishing method.  To overcome the social foundational challenges identified in earlier chapters (e.g., Chap 3.4, Chap 6.2)—such as institutional capacity and conflict—MPA governance must incorporate recognition of these identities and communities.  Of these groups, whom does the MPA benefit (i.e., who maintains ES access)?  Who does the MPA impact (i.e., whose ES-SW linkages have changed the most)?  Do these two "whom's" align?  In this section, I aim to answer these questions.  I

discuss changes to ecosystem service access and impacts to social wellbeing experienced by inshore fishers, offshore fishers, and non-fishers.

### 7.3.1 Inshore Fishers

Inshore fishers fish for coral reef finfish near the coast (e.g., parrotfish, squirrelfish) (see Chap 3.2 and Chap 5.1.1). In Bluefields, inshore fishers typically fish using spear guns, nets, and pots. Inshore fishers have expressed the greatest concern over the MPA, mentioning that it has created barriers to the access of provisioning, cultural, and supporting ES (summarized in Table 7.1). In the following subsections, I discuss these changes to ES access and their implications for SW of inshore fishers (Figure 7.13).
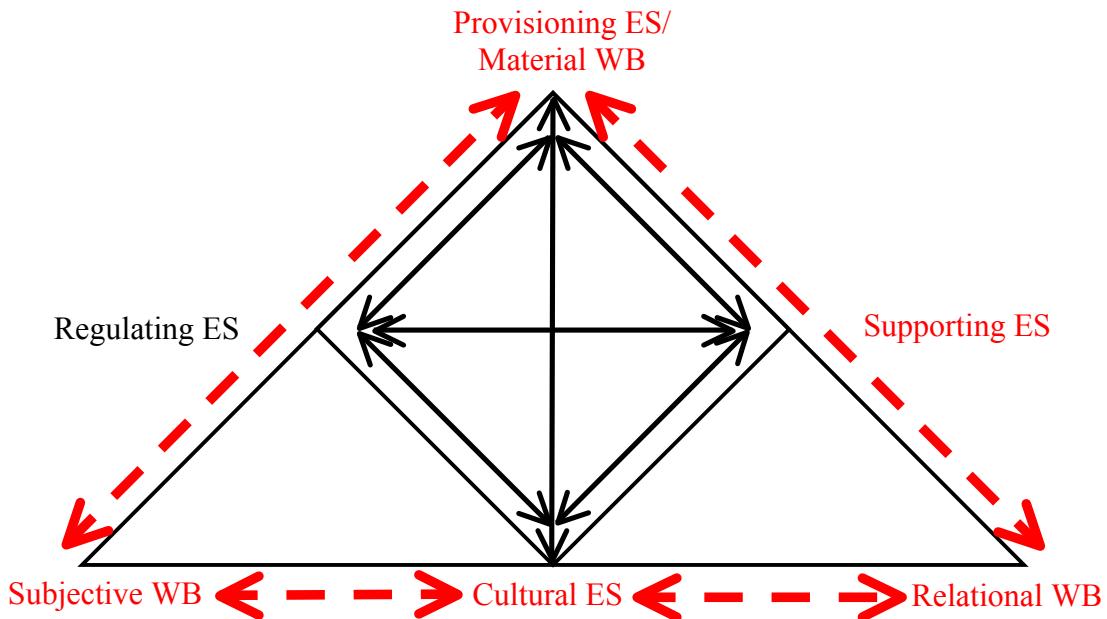


**Figure 7.13 Changes in ES-SW linkages for inshore fishers since MPA implementation.**

**\*bolded red dashed-lines indicate areas of concern and decline**

7.3.1.1 *Access to Provisioning ES*

Since MPA implementation, inshore fishers have noted catching less fish and sea life—the primary provisioning ES of concern in Bluefields (Chap 5.1):

> Nothing is on the outside to catch. Sometimes you will throw the net
> outside, sometimes it's all of three fish, four fish. So you have to have

122

tank to dive on all those mighty deep spots…[or] you have to have a
LONG net.  And the best places we used to fish in are the places they have
blocked off and turned sanctuary—the best places where fish travel where
we used to fish.  The worst thing is there is nothing outside…when you
buy gas and go out there you just waste time.  It hardly makes sense you
go there. (26)

Spear fishers, in particular, have discussed augmented risks to health and safety, since they are

forced to dive deeper and swim farther to access provisioning ES:

We are not catching much anymore, unlike before the sanctuary was there.
We cannot dive where we would like to anymore.  Diving is hard because
it is deep, where we're going now, and remember, we don't have tanks.
It's getting rougher and rougher every day. (25)

Paradoxically, while the goal of the MPA is to protect sea life, one spear fisher noted that

he could no longer be selective of the fish he is hunting.  For example, he may be forced to

choose a smaller fish that has gone through fewer reproductive cycles:

I have to take anything I get.  I have no control over it.  When I am on the
inside [of the sanctuary], I can see a school of fish and choose which one I
want…I go in and see a school of fish, there is a big one there and a small
one, I can pick out the big one and leave the small one…But if I'm at the
deep, whenever I go down, if I see this big one and I don't get it, whoever
I catch will feel all the anger of me coming from up there to get
something, I won't leave [a small fish] to swim up.  So it's whatever I get,
I take, you understand? (42)

Some community leaders have pointed to the shallower eastern portion of the BBSFCA as a safe,

viable diving depth.  Yet, spear fishers have argued that the issue is not just a matter of depth, but

also that these shallower areas do not contain the right habitats for fish or lobster.  Other issues

with habitat are specified in the following section.

### 7.3.1.2 *Accessing Supporting ES*

While MPAs generally support biodiversity and the regeneration of habitat and refugia (Halpern,

2003; Potts et al., 2014), some fishers have not been able to access the related and theorized

"spillover" benefits of these supporting ES.  Despite anecdotal accounts of increasing fish

123

populations, fishers suggest that fish are easier to catch within the sanctuary because they are less transitory, supporting earlier discussions of high MPA fidelity (Pittman et al., 2014):

> The fish [leave] from the deep to the sanctuary to feed. When they come in there we can't set out nets there to catch them. So then they feed and go back out, but we can't catch them inside there. (29)

Fishers have increased their fishing efforts outside of the sanctuary to little effect:

> Well, many of our friends that we hear talking about it say they've set pots out there and they have to be going too far. And because of the sanctuary…if you set pots outside of the sanctuary you aren't going to catch any fish. The closer they are to the stone [i.e., coral reef outcrops], we catch the fish better. But because they have locked off all the stones inside, they have to be putting them on the grass. When they put them there, they don't catch anything. (31)

As such, inshore fishers have voiced disapproval over the siting of BBSFCA, as the MPA currently bars access to former fishing grounds.

### 7.3.1.3 *Accessing Cultural ES*

Certain districts, such as Auldayr and Paradise, have a disproportionately large number of inshore fishers. Located away from the aesthetic coastal beaches of Bluefields (Auldayr is inland, while Paradise is adjacent to a mangrove), neither of these places receives benefits from tourism—a major cultural ES for coastal areas (Chap 5.2.5). Likewise, these districts have garnered less attention for community development projects (e.g., C-ARK and Food for the Poor projects centered around Belmont). Lacking outside interest and external aid, fishers cannot access resources for offshore fishing, and scrimp to afford even a basic canoe (Participant 40, personal communication, Oct 2015). For example, of the seven surveyed fishers in Auldayr, one swam out directly from shore (i.e., did not own a boat), while the rest owned canoes. However, even in places where tourism is growing, the benefits from this growth do not trickle down to all community members (Sinclair-Maragh & Gursoy, 2015). Therefore, many inshore fishers in Belmont have also not been able to access the direct monetary benefits of the tourism. In fact, one fisher pointed explicitly to the conflicts of tourism:

> Fishermen can't go into their sanctuary and do whatever, and they run
> eco-tours and all of these things. So the sanctuary is not for fishermen's
> benefit, it's for the benefit of tourism…I'm a spear fisherman too, and I
> don't think they should put all the blame on the spear fisherman. They
> should place blame on the soakaway pits, the hotels that are acting
> commercially and leaching into the ocean and not practicing best
> environmental practices, and stop attacking spear fishermen. (36)

Other community members have expressed anger over the decline in access to other vital cultural ES, such as heritage values and knowledge systems:

> I have my kids growing up, and I live on the beachfront here, and I have
> my kids, and you build a sanctuary in MY back yard? And then you're
> going to tell my kids that they cannot learn to fish on the beach there?
> They cannot learn to hook fish? That's crap. (15)

The deterioration of cultural ES access can have widespread impacts, discussed next.

### 7.3.1.4 *Changes in ES-SW Linkages*

Barriers to provisioning and supporting ES (i.e., part of the "ecological apex") have negatively impacted all three dimensions of wellbeing. Provisioning ES and supporting ES are the basis of material wellbeing for fishers, who depend on fish, sea life, and coastal-marine habitats for vibrant livelihoods (Chap 6.1). Failure to achieve material wellbeing consequently affects both relational and subjective wellbeing. First, unsuccessful fishing efforts and financial insecurity (i.e., failure to achieve material wellbeing) can create or exacerbate existing interpersonal conflicts. For example, financial difficulties are a well-documented source of conflict in new marriages (Stanley et al., 2002). Second, in Bluefields, material wellbeing not only impacts immediate relationships, but also reinforces generational poverty by limiting education:

> You would go out to sea and haul ten traps and come back with 5lbs of
> fish, which cannot send the kids to school…I had five children, if I could
> send two today, tomorrow I can't send the same two, then I would send
> the next two the next day, it wasn't working. (5)

Finally, fishers' relational wellbeing can be affected by "sea madness". Sea madness is a local term for the state of irritability stemming from long periods of time at sea and feelings of disorientation upon returning to land:

No trees are there, no shelter, so the sun is on your head, on you the whole
time; so it penetrates through your body.  So when you come back, you're
supposed to take some time to cool off before anyone even says anything
to you.  You went out there; you're coming back with anger. (6)

Sea madness is intensified by the frustration of failed and wasted fishing efforts.

The dangerous lengths taken by some spear fishers to access provisioning ES, alluded to
in Chap 6.1.1.3, can negatively impact subjective wellbeing by raising fear, doubt, and anxiety
over personal safety: "We want to let them know that we are worth something, and things that
we are doing are risky, because we swim from here, 3-4 miles out, it's really risky" (6).
Likewise, because of the MPA, some fishers are forced to live day-to-day and "hand to
mouth"—promoting feelings of uncertainty and insecurity:

We can go out here today and catch not even a pound of fish to buy back
the gas, no gas, but the next day we're going back.  Sometimes maybe we
come and borrow money to buy back gas to go back out to sea. (26)

Related to the subject of borrowing money, independence—a fundamental aspect of subjective
wellbeing for fishers (Weeratunge et al., 2014)—has been stripped down by the reduction of
provisioning ES access:

Because that's where the fish are.  How many weeks have you gone to sea
and not made any money because no fishes are up here?  All of them are
locked up in the sanctuary like they're in a cage.  You're not living any
independent life. (21)

The BBSFCA is designed to protect coastal-marine ecosystems (i.e., the ecological apex of the
CF).  However, in practice, resulting enhancements to provisioning and supporting ES (e.g.,
larger fish, increased fish stocks, healthier coral reef) may be moot if they are inaccessible to
vulnerable community groups.

Like provisioning ES and supporting ES, cultural ES access can also influence the three
dimensions of SW.  To begin, tourism is linked to material wellbeing for many community
members and their families (Sec 7.2).  In fact, the pattern of strong ties between tourism and
material wellbeing around the world have led some authors to argue that tourism is a
provisioning ES, rather than a cultural ES (Abson & Termansen, 2011; Daw et al., 2011).  Three

fishers from Black's Bay expressed strong and explicitly negative feelings towards tourism, stating that while tourism is important for the community, the benefits of tourism are not equitably distributed. The impacts of tourism, alongside the contentious issue of who receives its benefits (Chap 5.2.5), have been detrimental to the relational and subjective wellbeing of some inshore fishers. While tourism supports material wellbeing for a number of community members, fishers' perceptions of tourism have resulted in escalating tension (e.g., between foreign hoteliers and the community) and uncertainty (e.g., increasing coastal development may detract from scarcely-available fishing grounds and recreational areas).

Other intangible cultural ES—such as sense of place, heritage value, spiritual value, and knowledge systems—have been negatively impacted by the BBSFCA. As the evidence shows in an earlier chapter, fishing is an integral part of a fisher's identity (Chap 6.3.1) and heritage (Chap 5.2.3), while also serving as a spiritual and meditative activity (Chap 5.2.6). For fishers, involuntary disengagement from this identity, heritage, and spirituality is undermining: 1) material wellbeing (e.g., by driving fishers and their children to pursue alternative livelihoods for which they may lack knowledge and skills); 2) relational wellbeing (e.g., erosion of fishing families and partnerships, loss of bonding opportunities and social learning between generations); and 3) subjective wellbeing (e.g., loss of identity, culture, and spiritual connection).

In conclusion, for many inshore fishers in Bluefields, the BBSFCA has drastically changed access to key provisioning, supporting, and cultural ES. These changes in access have negatively impacted material, relational, and subjective wellbeing (Table 7.1). The implications of these negative feedbacks on the challenges and opportunities of MPA governance will be discussed in the following chapter.

**Table 7.1 Summary of direct qualitative changes to ES-SW linkages for inshore fishers.**

| | ES Categories* | | Material Wellbeing** | | | Relational Wellbeing** | | Subjective Wellbeing** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Livelihood Diversity | Assets | Access to Primary Resources | Social Institutions | Fisher Relations | Self-Identity | Living Right | Satisfaction | Autonomy |
| Provisioning | Fish | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Provisioning | Other sea life | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Provisioning | Raw materials for art | ✖ | N/A | | | | | | | | |
| Provisioning | Abiotic resources | ✖ | N/A | | | | | | | | |
| Cultural | Recreation and leisure | ✖ | N/A | | | | | | | | |
| Cultural | Aesthetic | ✖ | N/A | | | | | | | | |
| Cultural | Cultural heritage | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Cultural | Knowledge systems | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Cultural | Tourism | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Cultural | Spiritual and religious | ↓ | ✖ | ✖ | ✖ | ✖ | ✖ | ↓ | ↓ | ↓ | ✖ |
| Cultural | Inspiration for art | ✖ | N/A | | | | | | | | |
| Supporting | Habitat and refugia | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Supporting | Hydrological cycling | ✖ | N/A | | | | | | | | |
| Supporting | Biodiversity | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ |
| Regulating | Weather and storm mitigation | ✖ | N/A | | | | | | | | |
| Regulating | Coastal erosion prevention | ✖ | N/A | | | | | | | | |

*Symbols indicate changes to ES access since MPA implementation. **Symbols indicate changes to SW resulting from changes to ES access. Symbols: ↓ signifies a decrease, ↑ signifies and increase, and X signifies that fishers indicated no changes during the data collection process. N/A indicates that the SW category is not applicable since there were no indicated changes to ES.*

## 7.3.2 Offshore Fishers

Offshore fishers are fishers who fish for coastal pelagic species in the deep sea, or in the offshore banks of Jamaica (see Chap 3.2 and Chap 5.1.1). Offshore fishers, in comparison to inshore fishers, have felt few impacts from the BBSFCA. In fact, of the few impacts listed by offshore fishers, most have been positive. For example, while not directly related to ES, offshore fishers have noted that they feel more secure and safe in the presence of the MPA:

> Why I say positive is because we have [wardens] who work in the night and day [at the sanctuary], if people would come in and do drug things and other things that are illegal, you know that they are in the sanctuary so it prevents it, and the harm that some will do, when somebody is there, it won't happen. (32)

In the following subsections, I discuss the changes to ES-SW linkages for offshore fishers since MPA implementation (Figure 7.14)
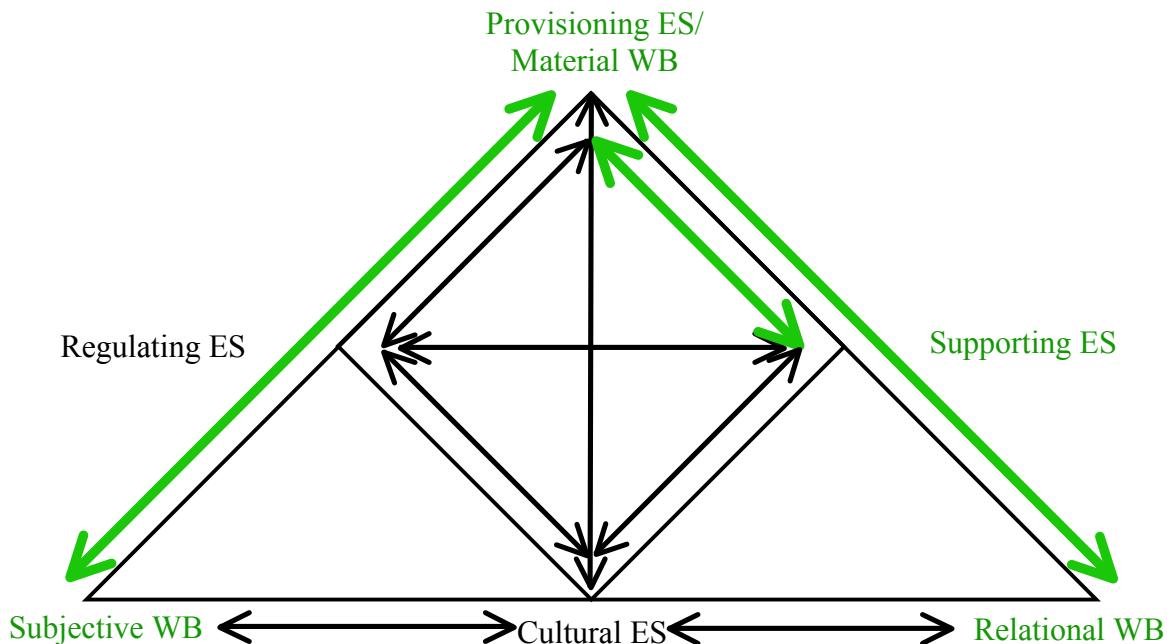


**Figure 7.14 Changes to ES-SW linkages for offshore fishers since MPA implementation.**

**\*bolded green lines indicate areas of improvement**

7.3.2.1 *Access to Provisioning and Supporting ES*

Several offshore fishers expressed that the BBSFCA does not impact them directly, but that it is a necessity for the future of fish populations:

> The sanctuary is a good thing in the area, because I don't fish in there you know, I fish in the far sea. So we don't do any fishing inside there. Those guys who are fishing in there, they need to take care of the sanctuary there. Because you have types of fish that you don't catch coming along, and the size of fish too. So the sanctuary down there, if they didn't have it, the fishermen would suffer more. They would suffer more, because the sanctuary, that's what makes the fish grow. (38)

Other offshore fishers have claimed that they receive direct benefits (e.g., more diverse fish, bigger fish) from the spillover effects of habitat and refugia:

> Not only that, but the fish stock went down rapidly about 5 to 10 years ago. Now, because of the sanctuary, it has replenished and it is looking better. It has made my life better when going out to fish. (2)

Therefore, for some offshore fishers, access to provisioning and supporting ES has increased since MPA implementation.

7.3.2.2 *Changes in ES-SW Linkages*

In comparison to inshore fishers, offshore fishers in Bluefields have experienced fewer changes to SW since the implementation of the BBSFCA (Table 7.2). Moreover, the emerging changes have been largely positive: 1) some fishers claim to have better catches (e.g., bigger fish, more fish, more diverse fish); and 2) some suggest that the protected habitat within the MPA supports the growth of migratory fish populations and produces spillover effects—which, again, improves catch. Improved catch rates can support: 1) material wellbeing by allowing fishers to achieve more financial capital, assets, and other primary resources (Chap 6.1); 2) relational wellbeing by increasing financial security and, subsequently, the unity of fisher families (Chap 6.2); and 3) subjective wellbeing by enhancing feelings of life satisfaction and autonomy (e.g., financial security safeguards a fisher's independence) (Chap 6.3). Therefore, while offshore fishers are actors in the governance of the BBSFCA, data from this research demonstrate that these fishers hold fewer stakes in the protected area than inshore fishers.

**Table 7.2 Summary of direct qualitative changes to ES-SW linkages for offshore fishers.**

| | ES Categories* | | Material Wellbeing** | | | Relational Wellbeing** | | Subjective Wellbeing** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Livelihood Diversity | Assets | Access to Primary Resources | Social Institutions | Fisher Relations | Self-Identity | Living Right | Satisfaction | Autonomy |
| **Provisioning** | Fish | ↑ | ✖ | ↑ | ↑ | ✖ | ↑ | ✖ | ✖ | ↑ | ↑ |
| | Other sea life | ↑ | ✖ | ↑ | ↑ | ✖ | ↑ | ✖ | ✖ | ↑ | ↑ |
| | Raw materials for art | ✖ | N/A | | | | | | | | |
| | Abiotic resources | ✖ | N/A | | | | | | | | |
| **Cultural** | Recreation and leisure | ✖ | N/A | | | | | | | | |
| | Aesthetic | ✖ | N/A | | | | | | | | |
| | Cultural heritage | ✖ | N/A | | | | | | | | |
| | Knowledge systems | ✖ | N/A | | | | | | | | |
| | Tourism | ✖ | N/A | | | | | | | | |
| | Spiritual and religious | ✖ | N/A | | | | | | | | |
| | Inspiration for art | ✖ | N/A | | | | | | | | |
| **Supporting** | Habitat and refugia | ↑ | ✖ | ↑ | ↑ | ✖ | ↑ | ✖ | ✖ | ↑ | ↑ |
| | Hydrological cycling | ✖ | N/A | | | | | | | | |
| | Biodiversity | ↑ | ✖ | ↑ | ↑ | ✖ | ↑ | ✖ | ✖ | ↑ | ↑ |
| **Regulating** | Weather and storm mitigation | ✖ | N/A | | | | | | | | |
| | Coastal erosion prevention | ✖ | N/A | | | | | | | | |

*Symbols indicate changes to ES access since MPA implementation. **Symbols indicate changes to SW resulting from changes to ES access. Symbols: ↓ signifies a decrease, ↑ signifies and increase, and X signifies that fishers indicated no changes during the data collection process. N/A indicates that the SW category is not applicable since there were no indicated changes to ES.*

### 7.3.3 Non-Fishers

The term non-fishers, in this case study, refers primarily to: 1) the game wardens of the Bluefields Bay Fishermen's Friendly Society, who are charged with managing the sanctuary's day-to-day activities (see Chap 3.3.1); and 2) non-fishing women in the community. In this section, I discuss the changes to ES access experienced by this community group, and then examine how these changes have impacted SW (Figure 7.15).
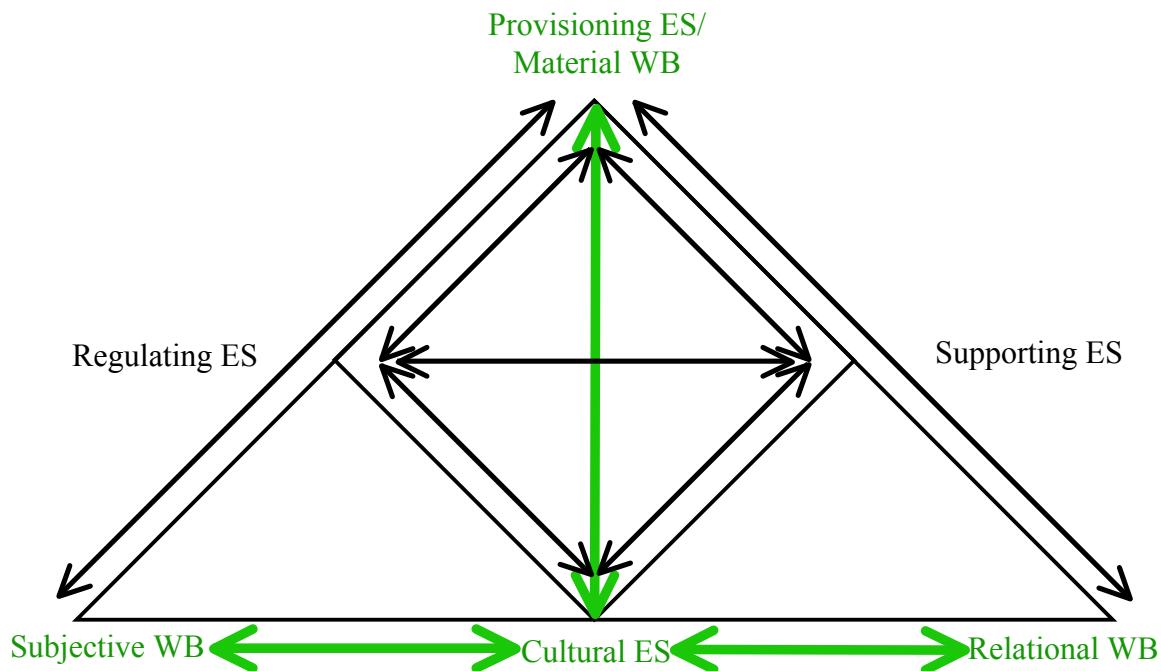


**Figure 7.15 Changes to ES-SW linkages for non-fishers since MPA implementation.**

**\*bolded green lines indicate areas of improvement**

Non-fishers, by definition, do not rely on fish for their primary income. While non-fishers may still consume fish as a provisioning ES, fish are not tied to material wellbeing. As such, this community group has experienced fewer negative impacts from the BBSFCA than inshore fishers. In fact, for game wardens, the MPA has become a viable source of livelihood. Many wardens of the BBSFCA were former fishers who could transition away from fishing. For example, when questioned if they still needed to fish in their daily lives, one warden replied, "Not really because I'm a game warden now. I can fish but I don't do it all the time" (3).

Therefore, the sanctuary provides a level of financial stability that would be unattainable through fishing alone:

> [The sanctuary] provides employment for some of the fishers because they
> are working as game wardens.  Even though it takes a long time
> sometimes for them to gain their salary, because the government can't pay
> it on time, they still get it at the end of three months.  So, many of them
> are able to at least send their children to school, because they maybe
> would not have earned that money over the three month period from just
> fishing. (1)

While wardens are clearly supportive of the sanctuary, non-fishing women in the community have voiced opinions ranging from approval to apathy.  Those in support of the BBSFCA saw the MPA as a gift to future generations:

> What they're doing is...they had a sanctuary out there and people used to
> go and catch the small fish.  Now the sanctuary is someplace where [the
> fish] can grow more.  It will actually benefit persons largely later down the
> line…so I don't see why it would be a threat to anyone; it is good. (32)

In Bluefields, some women are also fish vendors.  Yet, despite the presence of local fishers, vendors often sell fish originating from Whitehouse—a nearby town with a much larger fishing operation.  Unsurprisingly, some vendors expressed disconnect and apathy towards the BBSFCA, with one vendor repeatedly stating "wah gwan can gwan"—patois slang translating to, "whatever is going on can continue going on".  Evidently, of all non-fishing community groups, wardens have received the greatest number of benefits from the BBSFCA.  I discuss some of these benefits, next.

### 7.3.3.1 *Accessing Cultural ES*

The MPA has led to an increase in access to certain cultural ES, including aesthetics, cultural values, knowledge systems and educational values, and tourism.  First, some non-fishers have remarked on the improved aesthetics of the sea, stemming from the reappearance of wildlife: "I know I see a lot of changes with lobster at the dock—right under the foot—I saw a lobster that I've never seen there before.  I see a lot of fish that I've never seen there before" (10); or,

> There was a time when you wouldn't even see a bird here. Yesterday I
> was coming from the sea and I counted over 33 birds on the water; they
> are there because fish are in the bay, if fish weren't in the bay, [the birds]
> wouldn't be there. (5)

For some, the MPA has also enhanced access to cultural heritage "bequest" values, defined as "the importance people place on preserving or maintaining ecosystems for future generations" (Oleson et al., 2015, p. 104):

> There is a glimmer of hope for sustainability. Before the sanctuary, it was,
> in my mind, it was doomed. If something wasn't done, we would be
> going downhill…Sustainability is critical. I don't know about those who
> might be going off to another place that some God prepared for them and
> they are leaving this earth, I don't know about that. What I know is that I
> am living here, and generations and generations to come will be living
> here, so whatever we're doing here for generations to come to enjoy what
> we are enjoying is critical. So I feel like I borrowed the earth from my
> children and I need to make sure that I give it back to them intact. (19)

One warden stated that the sanctuary provides inspiration and opportunities for learning:

> Because of the sanctuary, some of these young fishermen were educated
> about the importance of the corals, the sea grass, because they were just
> going to sea and didn't know the importance of these things. It wasn't
> until we had workshops here that some of the divers knew that the coral
> was alive, a live animal. (1)

Likewise, relating to improved aesthetics, some wardens believe that the sanctuary will boost tourism in the community:

> Well, we need to start getting visitors and taking them to the sanctuary,
> snorkeling, show them the coral, the eco reef that we have here. We have
> 350 artificial reefs inside here; we also have a coral nursery…Say you do
> a tour and a percentage goes back to the Society that can help to run the
> sanctuary. (5)

Next, I discuss the relevance of cultural ES access to SW of non-fishers in Bluefields.

### 7.3.3.2 *Changes in ES-SW Linkages*

For some non-fishers, more access to cultural ES has increased all three dimensions of SW (Table 7.3). To begin, tourism has improved aspects of material wellbeing for some non-fishers

who work in the hospitality and service sector (e.g., for travel companies, restaurants, hotels). Some wardens posit that tourism could be a viable alternative livelihood for fishers in the future, although there is currently a lack of infrastructure for this transition (Chap 3.4.3):

> If we could set up some sort of tourism aspect where every fisher person can come and service tourists in the sanctuary, then it would be more effective for everybody. So instead of us just catching the fish, we would take someone to see the fish and it will be there longer. (1)

Although, as discussed in a previous chapter, the role of tourism in community development has not escaped controversy (Chap 5.2.5). Relational wellbeing is impacted by the determination of who receives the benefits of tourism. As discussed earlier, tourism is not a viable option for all districts, and the distribution of benefits is often unfair.

For wardens of the BBSFCA, their roles in protecting the bequest values of the sea have enhanced subjective wellbeing by fostering a sense of identity, purpose, and stewardship: "[The sanctuary] has made me feel that I have a responsibility to secure a part of our environment and a part of nature" (4), or, "We're protecting this area here and there are lots of fish because of it" (7). Likewise, opportunities to share cultural and educational values of the local coastal-marine environment have enabled some wardens to form new personal relationships: "I've found myself going international because of the fish sanctuary. A lot of people know me because of the fish sanctuary—like people in higher classes, in the community and everywhere" (8). Connected through the shared interest of preserving coastal-marine habitats and bequest values, the Bluefields Bay Fishermen's Friendly Society has created new institutional relationships with local and multinational organizations: "We got some funding and training from USAID through the Jamaica Exporters Association. So, we did two weeks at the Caribbean Maritime Institute. We did training in seamanship and first aid and navigation" (5).

In summary, like offshore fishers, non-fishers are less concerned with provisioning ES access in the BBSFCA than inshore fishers. However, unlike offshore fishers, many of the non-fishers that participated in this case study hold stakes in Jamaica's commitment to conservation, as the MPA has become an important livelihood opportunity for some community members. The implications of these findings for MPA governance will be discussed in the following chapter.

**Table 7.3 Summary of direct qualitative changes to ES-SW linkages for non-fishers.**

| | ES Categories* | ES access | Livelihood Diversity | Assets | Access to Primary Resources | Social Institutions | Relations | Self-Identity | Living Right | Satisfaction | Autonomy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Material Wellbeing** | | | Relational Wellbeing** | | Subjective Wellbeing** | | | |
| Provisioning | Fish | ✖ | N/A | | | | | | | | |
| Provisioning | Other sea life | ✖ | N/A | | | | | | | | |
| Provisioning | Raw materials for art | ✖ | N/A | | | | | | | | |
| Provisioning | Abiotic resources | ✖ | N/A | | | | | | | | |
| Cultural | Recreation and leisure | ✖ | N/A | | | | | | | | |
| Cultural | Aesthetic | ↑ | ✖ | ✖ | ✖ | ✖ | ✖ | ↑ | ↑ | ↑ | ↑ |
| Cultural | Cultural heritage | ↑ | ✖ | ✖ | ✖ | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Cultural | Knowledge systems | ↑ | ↑ | ✖ | ✖ | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Cultural | Tourism | ↑ | ↑ | ↑ | ↑ | ↑ | ↓ | ✖ | ✖ | ✖ | ✖ |
| Cultural | Spiritual and religious | ✖ | N/A | | | | | | | | |
| Cultural | Inspiration for art | ✖ | N/A | | | | | | | | |
| Supporting | Habitat and refugia | ✖ | N/A | | | | | | | | |
| Supporting | Hydrological cycling | ✖ | N/A | | | | | | | | |
| Supporting | Biodiversity | ✖ | N/A | | | | | | | | |
| Regulating | Weather and storm mitigation | ✖ | N/A | | | | | | | | |
| Regulating | Coastal erosion prevention | ✖ | N/A | | | | | | | | |

*Symbols indicate changes to ES access since MPA implementation. **Symbols indicate changes to SW resulting from changes to ES access. Symbols: ↓ signifies a decrease, ↑ signifies and increase, and X signifies that fishers indicated no changes during the data collection process. N/A indicates that the SW category is not applicable since there were no indicated changes to ES.*

## 7.4 Conclusion

I began this chapter by reviewing and validating the conceptual framework that guided my research (Sec 7.1). Then, I provided an overview of ecosystem services and social wellbeing linkages for fishers and non-fishers (Sec 7.2). Next, I examined changes to provisioning, regulating, supporting, and cultural ES access for key actor groups after the implementation of the BBSFCA, including: 1) inshore fishers (Sec 7.3.1); 2) offshore fishers; (Sec 7.3.2) and 3) non-fishers (Sec 7.3.3). I followed this analysis with a discussion on how the BBFCSA has influenced the three dimensions of social wellbeing (i.e., material, relational, subjective) for each community group.

I posed three central questions for this analysis of changing ES-SW linkages, which are relevant for understanding governance challenges: 1) who does the MPA benefit; 2) who does the MPA impact; and 3) do these two "whom's" align? My findings suggest that: 1) inshore fishers have experienced the largest number of negative impacts in accessing provisioning, cultural, and supporting ecosystem services, and that this decline has been detrimental to all three dimensions of social wellbeing; 2) offshore fishers have experienced mostly positive impacts (i.e., increased access to provisioning and supporting ES, improved SW), or were largely unaffected by the BBFCSA; and 3) like offshore fishers, non-fishers have experienced mostly positive impacts (i.e., increased access to cultural ES, improved SW), although, these impacts were positively correlated with the individual's involvement in sanctuary management. Therefore, the MPA has benefited offshore fishers and non-fishers the most, while having a disproportionately larger negative impact on inshore fishers—in other words, these two groups do not align. In the following chapter, I analyze how these changing ES-SW linkages present challenges and opportunities for MPA governance.

# Chapter 8

## Governance of Marine Protected Areas

In the previous chapter, I examined the impact of the Bluefields Bay Special Fishery Conservation Area (BBSFCA) on ES-SW linkages in Bluefields. In this chapter, I discuss how these findings are relevant to the governance of the BBSFCA, and to the governance of marine protected areas (MPAs), more broadly. This analysis of MPA governance corresponds to objective four of my research (Box 8.1). General governance challenges for Bluefields, introduced in Chapter 3, include institutional capacity, conflict, and the absence of alternative livelihood opportunities. In Chapter 6.1.1.1, I illustrated that alternative livelihoods amongst fishers is common. However, these alternatives do not support material wellbeing enough to facilitate a full "fishery exit" (see Chap 7.1.1). In the absence of viable livelihood transitions, some fishers will continue to fish. Thus, MPA governance processes must move towards enhancing institutional capacity and reducing conflict—two themes which contribute to the discussions in this chapter. I begin by examining potential modes of governance in Bluefields, drawing from both literature and questionnaire data indicating community preferences. In this examination, I provide evidence for why co-management is the best "fit" for Bluefields. I conclude this chapter with challenges and opportunities for the transition towards co-management of the BBSFCA.

**Box 8.1 Review of research objectives.**

1) Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers);
2) Define how a marine protected area (MPA) has changed access to these bundles for each group;
3) Examine how changes in access to these bundles have affected social wellbeing (SW) (i.e., material, subjective, and relational wellbeing); and
4) **Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).**

## 8.1 Mode of Governance

Governance, in the context of this research, was defined in Chapter 1 as:

> The interrelated and increasingly integrated system of formal and informal rules, rule-making systems, and actor-networks at all levels of human society (from local to global) that are set up to steer societies towards preventing, mitigating, and adapting to global and local environmental change (Biermann et al., 2009, p. 279)

Management—a crucial aspect of governance—can be distinguished as the "decisions about use patterns as well as about transforming [a] resource by making improvements" (Kearney et al., 2007, p. 82) (see also Chap 2.1).  As Bene and Neiland (2006, p. 10) write, "management is about action, governance is about politics".  Accordingly, governance can involve a wider sharing of powers than management (Kearney et al., 2007).  In the previous chapter, I discussed the "for whom" in policy analysis, and determined that the BBSFCA does not benefit the actors that it impacts most in the short-term—namely, inshore fishers.  Having identified "for whom" the MPA should be governed to enhance success, this section examines potential approaches for "how".  To inform debate around the "fit" of different modes of governance in the Jamaican SSF context (e.g., mechanisms, strategies, and partnerships for siting, design, and management of MPAs), questions for this research pertained to both: 1) who should manage the MPA (i.e., day-to-day actions); and 2) who should make decisions about the MPA (see Appendix C).

When asked about who should manage the sanctuary, nearly half of questionnaire respondents (see Chapter 4 for methods) proposed that management should be state-based (Figure 8.1).  Of the remaining fishers, 33% supported a more community-based approach (i.e., either wardens or elected representatives), and 16% supported a hybrid arrangement (n=77 fishers).  Within the 12 fishers who supported a hybrid arrangement, seven chose co-management.  Co-management is a compromise between the two majority groups, described as the "middle course between state-based and community-based management" (Plummer & Armitage, 2007, p. 834). Preference for top-down management of the sanctuary contrasts sharply with previous findings from interviews on relational wellbeing, which suggested a distrust of authority (Chap 6.2.2).  The resulting contrast may be an example of error (e.g., respondents not understanding the question, more on error in Chap 4.7), or reflect that the authority referenced by

participants was not the government, but rather, the Bluefields Bay Fishermen's Friendly Society (BBFFS)—as illustrated by one fisher, "Society people is not for you, it's for they.  Do you understand what I'm saying?" (37).  Differing perspectives on the BBFFS suggest the presence of a community hierarchy.  Whereas some community members see wardens, who are part of the BBFFS, as part of their close circle or local institution (Chap 6.2.1), others see wardens as an external body of authority that is not working "for them".



**Who should manage the BBSFCA?**

- 47% Government and marine police
- 4% Private organization
- 15% Wardens
- 18% Elected representatives
- 16% Government and marine police
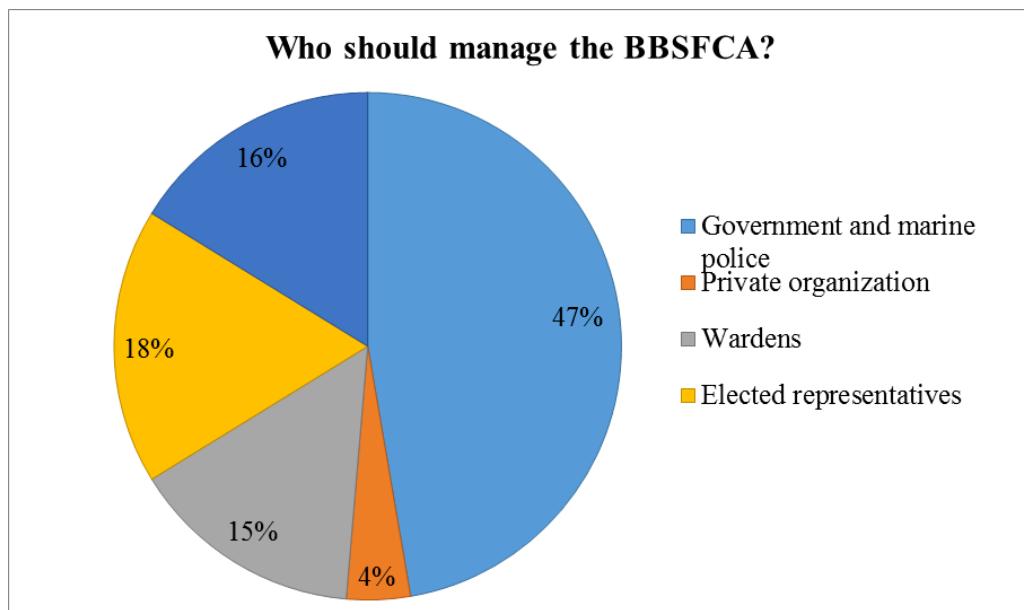
**Figure 8.1 Fisher preferences for MPA management (n=77 fishers).**

When questioned about decision-making power, a similar contrast emerged.  While government and fisher-elected representatives were equally ranked as first for voting power (by 34% of fishers, each), 44% of fishers also ranked government as last (n=77 fishers) (Figure 8.2).  The bimodal ranking for state-based decision-making highlights a polarized view of the government, and suggests that an entirely state-based governance arrangement would not receive full support from the community.  Interestingly, however, the second ranked option was overwhelmingly community-based, with 38% of individuals selecting a vote by fisher-elected representatives, and 36% of individuals selecting a vote by all interested fishers (n=77 fishers).  Again, the mixture of support for community-based and state-based decision-making suggests that there are diverse opinions in the community on who should govern the BBSFCA.

## Who Should Have Decision-Making Power?
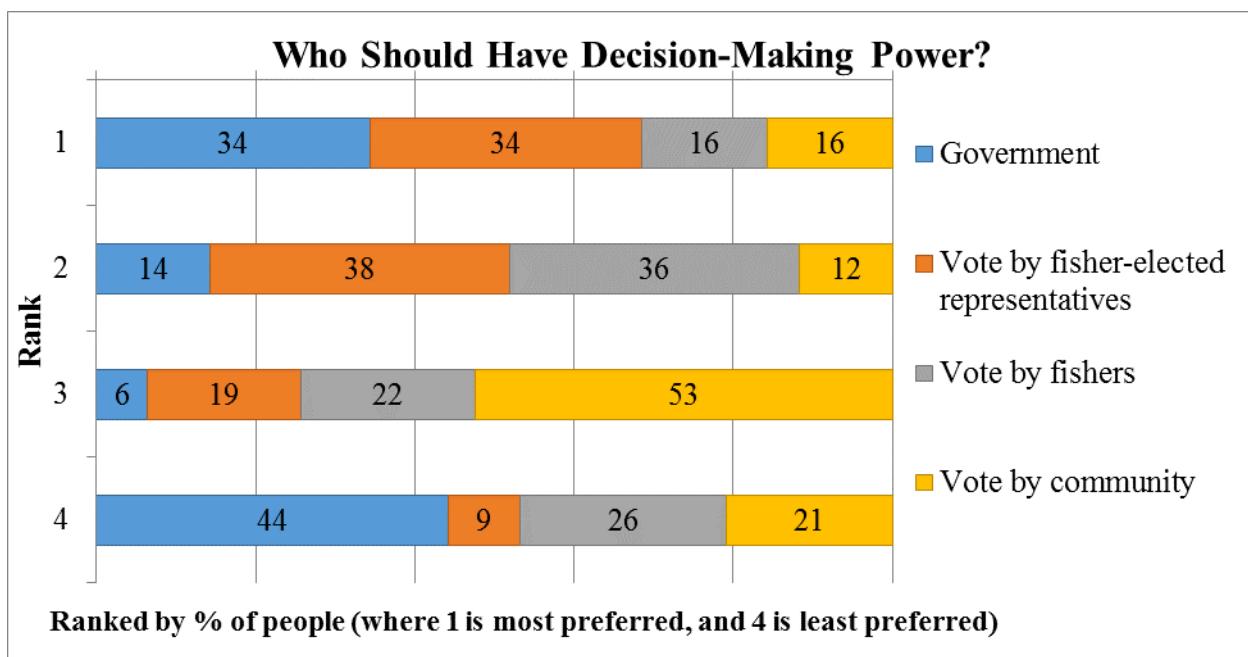


**Figure 8.2 Community rankings for decision-making power (n=77 fishers).**

In the following sub-sections, I explore three top-ranked governance options for the BBSFCA in Bluefields—state-based governance, community-based resource management, and co-management. First, I describe the reasons for why state-based governance is a poor fit in Bluefields. Second, I draw from ES-SW linkages to analyze the potential for community-based resource management. Finally, I conclude with an examination of co-management (i.e., collaboration between state and community), again incorporating ES-SW linkages, and argue that co-management is an appropriate compromise for Bluefields.

### 8.1.1 State-Based Governance

State-based governance, in this research, refers to a top-down and centralized form of governance where "central authorities at the top of international and national hierarchies make…important policy decisions" and "policies are implemented uniformly…by subordinates accountable to central authorities" (Brunner, 2010, p. 307). In Jamaica, the drive to implement environmental policies "has come…from the global arena" (Figueroa, 2005, p. 184). MPAs are viewed as a top-down decree from international hierarchies. Discussed earlier, top-down governance approaches in the context of SSF and MPAs have been unsuccessful, particularly

141

when they ignore community context (e.g., ES preferences, impacts of MPAs on SW) (Chap 2.1). In Jamaica, many MPAs were declared without a clear management plan or structure (Figueroa, 2005). According to Figueroa (2005), the government's move towards co-management—a governance approach attempted for a number of Jamaican MPAs (Alexander et al., 2015)—was the path of least resistance carved out by a lack of state funding for protected areas, rather than a genuine interest in involving communities and SSF. Community-based civil societies (e.g., fishers' associations) and NGOs were seen as an opportunity to share the financial and managerial burdens of these internationally imposed MPAs (Figueroa, 2005). As such, Figuera (2005) acknowledges that the Jamaican government does not have the institutional capacity to govern MPAs on its own. Moreover, research has supported that Jamaican state institutions (i.e., higher level relational wellbeing [Figure 6.3, Chap 6.2]) are weak, citing issues with corruption and crime (Jaffe, 2015; Johnson, 2014b; Moloney & Chu, 2014; Sutherland, 2014). Therefore, despite being indicated as a top preference by fishers in Bluefields, literature suggests that state-based MPA governance may be a poor fit in the Jamaican context.

### 8.1.2 Community-Based Natural Resource Management

Community-based resource management (CBRM) refers to a governance system that "seeks to encourage better resource management outcomes with the full participation of communities and resource users in decision-making activities, and the incorporation of local institutions, customary practices, and knowledge systems in management, regulatory, and enforcement processes" (Armitage, 2005, p. 703). Since the BBSFCA exists as a formal agreement with the state accompanied by *de jure* rules about resource use (e.g., the no-take rule), the MPA was not established through true bottom-up processes. Instead, I hypothesize about CBRM as a potential *de facto* mode of governance moving forward. This point reinforces the distinction between *de jure* government (e.g., laws, policies) and *de facto* governance (e.g., processes) (Bene & Neiland, 2006). However, based on design principles "[characterizing] robust institutions" for CBRM—first outlined by Ostrom (1990a) and then revised by Cox (2010)—the current capacity for CBRM in Bluefields is low. Table 8.1 describes these design principles, evaluates their presence in Bluefields, and explains their connection to ES-SW linkages in the community.

**Table 8.1 Ostrom's design principles, and their presence and application in Bluefields.**

|  | Description | Y/N | Rationale and ES-SW Linkages |
|---|---|---|---|
| 1A | Clear boundaries between legitimate users and non-users | No | Fishers in Bluefields have noted the intrusion of fishers from other communities (e.g., Savannah-la-Mar) in the scarce fishing grounds outside of the MPA.  More inshore fishers have been pushed into fewer areas, since they can no longer fish in the BBSFCA.  An inability to exclude illegitimate users from accessing provisioning ES is partly due to lack of relational wellbeing (e.g., social capital, collaboration) (Chap 6.2.2).  Fishers note that "outside" fishers use illegal and unsustainable methods, resulting in further decline in provisioning ES. |
| 1B | Clear boundaries are present that define a resource system | No | Conflict between districts blurs the social boundaries between resource users, as many community members see other districts within Bluefields as "they" (Chap 6.2.1.1).  Further, many fishers have noted that without markers (Chap 3.3.1), the physical boundaries of the MPA are unclear.  Fishers claim to have been wrongfully accused by wardens and police of fishing within the MPA (Chap 6.2.2.1).  These incidents negatively impact relational wellbeing. |
| 2A | Appropriation and provision rules are congruent with local social and environmental conditions | No | As a fishing community, the current no-take rule may support recovery of the resource, but has negatively impacted cultural ES (e.g., knowledge systems) (Chap 5.2) and material, (e.g., income for inshore fishers), subjective (e.g., fisher identity) and relational wellbeing (e.g., fishing families, fisher institutions) for inshore fishers, the main resource users (Chap 7.3.1). |
| 2B | The benefits obtained by users are proportional to the amount of inputs required (e.g., labour, material, money) | No | Community members have noted inequities in the distribution of benefits gained from alternative uses for the MPA (i.e., tourism) (Chap 5.2.5).  Without direct benefits from tourism (a vital cultural ES), the no-take rules of the MPA detract from provisioning ES access and the material wellbeing of inshore fishers, leading to cascading effects on other components of social wellbeing (Chap 7.3.1).  Inshore fishers have no incentive to offer input for CBRM.  Likewise, offshore fishers seemingly have no stakes in the MPA (Chap 7.3.2), and therefore also have no incentive for input.  Yet, identifying incentives for community involvement is a linchpin in conservation. |
| 3 | Most individuals affected by operational rules can participate in modifying the rules | No | Inshore fishers, whom are most affected by operational rules (i.e., greatest decline in ES-SW), cannot participate in modifying the rules.  This lack of control over ES access negatively impacts subjective wellbeing, as fishers feel powerless and a loss of independence (Chap 6.3.4 & 7.3.1.4). |

| | | | |
|---|---|---|---|
| 4A | Monitors who are accountable to the users monitor the appropriation and provision levels of users | No | Monitors (i.e., the wardens and marine police) are not accountable to users (mostly inshore fishers), and were not elected by fishers. Some fishers have noted an abuse of power by some wardens and marine police, resulting in a decline in relational wellbeing (Chap 6.2.2). |
| 4B | Monitors who are accountable to the users monitor the condition of the resource | No | Monitors are not accountable to the users, but they monitor the condition of the resource through the CLIF monitoring program, designed in partnership with CARIBSAVE (CARIBSAVE, 2013). |
| 5 | Appropriators who violate operational rules are likely to be assessed graduated sanctions by other appropriators, officials accountable to appropriators, or both | No | Fishers caught fishing in the MPA, or believed to be fishing in the MPA, are sanctioned by monitors who are not accountable to appropriators. Fishers have noted being unfairly sanctioned (Chap 6.2.2.1), leading to resentment towards monitors and a negative impact on relational wellbeing. |
| 6 | Appropriators and their officials have rapid access to low-cost local arenas to resolve conflict among appropriators or between appropriators and officials | No | Appropriators have no access to low-cost local arenas for conflict resolution. One fisher noted that when ticketed for fishing in the MPA, they are sent to state court and forced to pay a fine regardless of whether they are guilty. Fishers noted that they felt helpless in their situation, indicating a decline in subjective wellbeing. |
| 7 | The rights of appropriators to devise their own institutions are not challenged by external government authorities | Yes | Appropriators have some rights to devise their own local institutions. However, in the context of the BBSFCA, all fishers are represented by the BBFFS, regardless of whether they support the society, its practices, or the rules of the BBSFCA. Therefore, some community members feel unrepresented, indicating some institutional issues and low relational wellbeing in the community (Chap 6.2.2). Furthermore, higher-level institutional development has been difficult to achieve. |
| 8 | Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises | No | The BBFFS, as monitors who enforce the rules of the BBSFCA, are not well connected either horizontally (i.e., with other fishing associations, communities) or vertically (i.e., with larger government institutions) in their day-to-day operations. Although, they may occasionally attend regional meetings and workshops. Still, more effort is required to strengthen the institutional level of relational wellbeing in Bluefields. |

Of the eight design principles, the governance of the BBSFCA in Bluefields reflects only one. All of Ostrom's design principles align with elements of relational wellbeing, as they highlight importance of institutions in defining resource boundaries, management rules, and

144

monitoring (Chap 6.2). The migratory and fluid nature of coastal-marine resources is difficult to ignore (Chap 2.1.2), and relational wellbeing plays a key role in navigating both intra-community and cross-boundary issues. Community-based MPA management has to "scale up" to counteract large-scale issues such as overfishing, pollution, and climate change (Christie & White, 2007) (Chapter 1). While strong CBRM could enhance ES production within a protected area, provisioning ES could still be exploited outside of the MPA (Christie et al., 2002). Likewise, fishers may lack the capacity to preclude exploitation by non-users. For example, a case study by Basurto and Ostrom (2009) described a small-scale fishery in which successful CBRM led to an increase in natural resources, but a lack of state support ultimately meant an inability to exclude "roving bandits" (Berkes et al., 2006; Cudney-Bueno & Basurto, 2009). To ensure widespread protection of coastal-marine ES, authors have argued for a nested approach to MPA governance, where community-based MPAs are nested within higher institutions (Christie et al., 2002) (i.e., part of Ostrom principle eight). These social layers are recognized in the "relational landscape" of relational wellbeing (Chap 6.2.1). In this relational landscape, building institutional capacity through the process of "scaling up" would require collaboration between community and state.

### 8.1.3 Co-management

Research acknowledges that no single "institutional pillar" (i.e., state, community, or market) is a panacea, and that successful resource governance requires a diversity of linked institutions (Berkes, 2007; Ostrom et al., 2007). To this end, hybrid governance arrangements may be better suited for the complexity of environmental problems (e.g., the decline of coastal-marine resources [Chap 2.2]) (Lemos & Agrawal, 2006). Co-management—originating from the term co-operative management (Pinkerton, 1989), and also sometimes confusingly termed collaborative management (e.g., Ansell & Gash, 2008; Carlsson & Berkes, 2005; Cinner et al., 2012; Jones et al., 2013)—is a hybrid governance arrangement where there is a "sharing of power and responsibility between government and local resource users" (Berkes et al., 1991, p. 12). More broadly, co-management is "a spectrum of institutional arrangements in which management responsibilities are shared between the users (who may or may not be community-

based) and government" (Yandle, 2003, p. 180).  Yet, as a hybrid governance arrangement, co-management is not a panacea, either (Carlsson & Berkes, 2005; Yandle, 2003).

In Chapter 2, I established that coastal governance is a wicked problem where there can be no panaceas or "true" and finite solutions.  Instead, this research seeks to find a "better" solution in Bluefields.  Co-management has emerged as a potential better solution, based on: 1) the data collected from questionnaires, which indicated preference for state-based governance, CBRM, and hybrid governance (Sec 8.1); 2) consideration of this data in previous discussions, which found that neither state-based governance nor CBRM are feasible on their own (Sec 8.1.1 and Sec 8.1.2); and 3) the prevalence of co-management as a common governance arrangement in small-scale fisheries (e.g., Ayers & Kittinger, 2014; Dalton et al., 2010; Pomeroy et al., 2001). Co-management has many faces, but in this research, I consider co-management as a dynamic and ongoing process rather than as a destination (Berkes, 2009).

## 8.2 Co-management and Case Study Context

In Caribbean fisheries, previous research has examined three types of co-management: 1) delegated co-management (i.e., "government lets formally organized stakeholders make decisions"); 2) collaborative co-management (i.e., "government and…stakeholders work closely and share decisions"); and 3) consultative co-management (i.e., "government interacts often but makes all…decisions") (Pomeroy et al., 2004, p. 431) (Figure 8.3).  There has been limited research on co-management in Jamaica (e.g., Alexander et al., 2015; Figueroa, 2005), suggesting a gap in the literature where this thesis can offer contributions (Chapter 9).
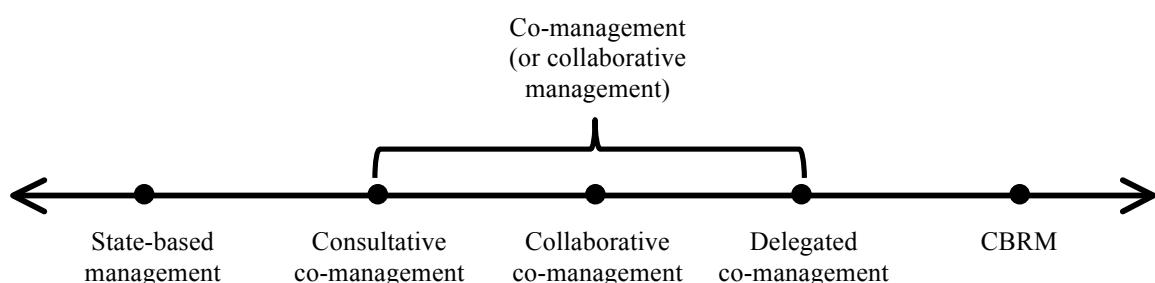


**Figure 8.3 Spectrum for modes of governance in this thesis (adapted from ICLARM & IFM, 1996).**

In Bluefields, the current mode of governance of the BBSFCA reflects state-based policy decisions (e.g., no-take rules, fines), but community-based day-to-day management (e.g., enforcement). This arrangement is formally recognized by a Memorandum of Understanding—a formal written agreement between the Government of Jamaica Fisheries Division and the BBFFS on the management of the fish sanctuary (Aiken et al., 2011). Thus, governance of the BBSFCA illustrates characteristics of both consultative and delegated co-management, while largely struggling to "meet in the middle" for collaborative co-management. Despite being delegated with the task of enforcing top-down rules, the BBFFS functions relatively autonomously. Conversely, while communities may have been consulted in early stages about whether they wanted an MPA (Kristos, 2013), policy decisions about the no-take rule and the location of MPA boundaries (contentious issues, discussed next) were made at the state level. In the following section, I discuss challenges and opportunities for Bluefield's transition towards co-management.

### 8.2.1 Challenges and Opportunities for Co-management of the BBSFCA

Berkes (2009) argued that co-management has evolved into a dynamic practice with many different faces (e.g., as power sharing, as institution building, as a process). Likewise, the "success" of co-management can be measured in many ways (e.g., condition of the resource, social dimensions of the system) (Wamukota et al., 2012). Research has indicated that it is possible to achieve ecological "success", while largely failing to create positive social impacts (Christie, 2004). In fact, in this case study, evidence has demonstrated an immediate and sudden negative social impact of the MPA on certain resource users, particularly inshore fishers (Chap 7.3.1). Considering these factors, it becomes difficult to define what "successful co-management" of the BBSFCA might look like in practice. However, Pomeroy et al. identified six conditions required for successful co-management in Caribbean fisheries (2004, p. 443). Many of these conditions overlap with CBRM design principles, discussed earlier (Table 8.1). Notably, there is considerable intersection at the emphasis of relational wellbeing. Table 8.2 describes these conditions for co-management success, evaluates their presence in Bluefields, and explains their connection to ES-SW linkages in the community.

**Table 8.2 Conditions required for successful co-management, and application in Bluefields.**

| | Description | Y/N | Rationale and ES-SW Linkages |
|---|---|---|---|
| 1 | Membership is clearly defined as to who has a stake in the fishery | No | In the context of ES-SW linkages, I define stakeholders as those who rely on accessing ES from the fishery for wellbeing. For all fishers, SSF are crucial for maintaining cultural ES (Chap 5.2). For inshore fishers, however, a lack of access to provisioning and cultural ES has negatively impacted all three dimensions of SW (Chap 7.3.1.3). Many of these fishers feel that their "stake" in the BBSFCA is not recognized by officials, as they are not given consultative roles, or involved in management. |
| 2 | There is a shared recognition of a resource use problem | Yes | Wardens and fishers alike recognize the poor state of coastal-marine resources. While discussing provisioning ES, many fishers noted a decline in size and diversity of fish over the years, despite increased fishing effort. Community leaders who spearheaded the MPA also noted that it was an effort to reverse environmental decline and to preserve bequest cultural ES values (Chap 7.3.3.1). |
| 3 | Clear objectives for management can be defined based on the problems and interest | No | MPA rules (e.g., no-take rules) indicate clear prioritization for provisioning ES in management objectives, while negating the importance of cultural ES (e.g., sense of identity, sense of place) (Chap 5.2). However, this research also points to the importance of acknowledging cultural ES in preserving SW, particularly relational and subjective wellbeing (Chap 7.1.3). Management objectives are discussed in Section 8.2.2. |
| 4 | Communication amongst the stakeholders is effective, and there is adequate networking | No | Analysis of relational wellbeing (Chap 6.2) in Bluefields demonstrates that communication is low amongst stakeholders (discussed further in Section 8.2.3), and that there is inadequate networking (discussed in Section 8.2.4)—both conditions hinder governance. |
| 5 | External agents provide support for the management but do not encourage dependency | No | Earlier, I discussed the BBSFCA as being supported by private, public, and NGO funding (Chap 1.3.2). One concern for current MPA leaders is of financial sustainability. The current no-take rule has been detrimental to inshore fishers (Chap 7.3.1), resulting in low voluntary compliance. Instead, wardens enforce MPA rules. Without money to support the salary of game wardens, the sanctuary would cease to function. As such, financial dependency has been an ongoing challenge for the BBSFCA. |
| 6 | Management rules are enforceable by resource users and the management authority | No | Related to Ostrom (1990) principles four and five, current management rules are enforced only by management authority. Resource users and other community members can report illegal fishing, but as discussed, many fear retaliation (Chap 3.4.1). Inshore fishers feel powerless in their situation, as they cannot appeal charges once they are accused of fishing in the MPA. These issues have led to a decline in both relational and subjective wellbeing (Chap 7.3.1). |

As with Ostrom's design principles, nearly every condition for co-management success is dependent on high levels of relational wellbeing. Drawing from these conditions and previous findings for ES-SW linkages, I evaluate challenges and opportunities for co-management of the BBSFCA in this section. I frame this discussion around: 1) management objectives, which directly influence ES access and material wellbeing; 2) communication and participation, which affect relational (e.g., communication supports relationships between wardens and fishers) and subjective wellbeing (e.g., fishers may feel empowered if they participate in governance processes); and 3) network structure, a reflection of higher order relational wellbeing (e.g., institutional level). These challenges and opportunities emerged from an analysis of gaps for co-management success (Table 8.2, above), and consideration of concerns from community members expressed during interviews, focus groups, and questionnaires.

### 8.2.2 Management Objectives

Pomeroy et al. (2004) indicated that there must be clear objectives to succeed in the co-management of SSF. For inshore fishers in Bluefields, there is no fishery if there are no fish, and there are no (or insufficient) fish if they cannot access habitat within the MPA. At present, fishery objectives are a source of contention—while MPA managers are concerned with achieving ecological goals (i.e., enhancing provisioning, regulating, and supporting ES) (7.1.1), fisher groups have focused on mitigating social and economic impacts (i.e., accessing cultural ES, enhancing SW) (Chap 7.1.3). These differing goals have become a source of antagonism (see Chap 3.4.2). As such, the BBSFCA's no-take rule is a challenge to co-management. The no-take rule has overlooked important social dimensions of resource management, resulting in decline of social wellbeing for inshore fishers (Chap 7.3.1). Inshore fishers had no say in management objectives or the rules that came with them, and have subsequently felt no responsibility to uphold them.

Data collected from interviews illustrated that fishers want changes to the BBSFCA, such as improving patrol of the MPA, allowing access to an inner shoal, moving the boundaries of the MPA closer to shore, allowing bait fishing in the sanctuary, providing a fund for better and legal fishing gear, and providing a fund to assist fishers in transitioning into tourism. After being

compiled as a list, fishers were asked to rank these items as part of the administered questionnaire (see Chap 4.2.5 for methods). In ranking the given list, fishers indicated preference for changing the boundaries of the sanctuary, and for improving capacity to enforce the rules of the MPA (Figure 8.4). While *de jure* rules and boundaries of the BBSFCA are unlikely to change, improvements to enforcement can still be implemented. These data provide opportunity and evidence to advocate for early and inclusive planning processes in the development of future MPAs (Chap 8.2.3).
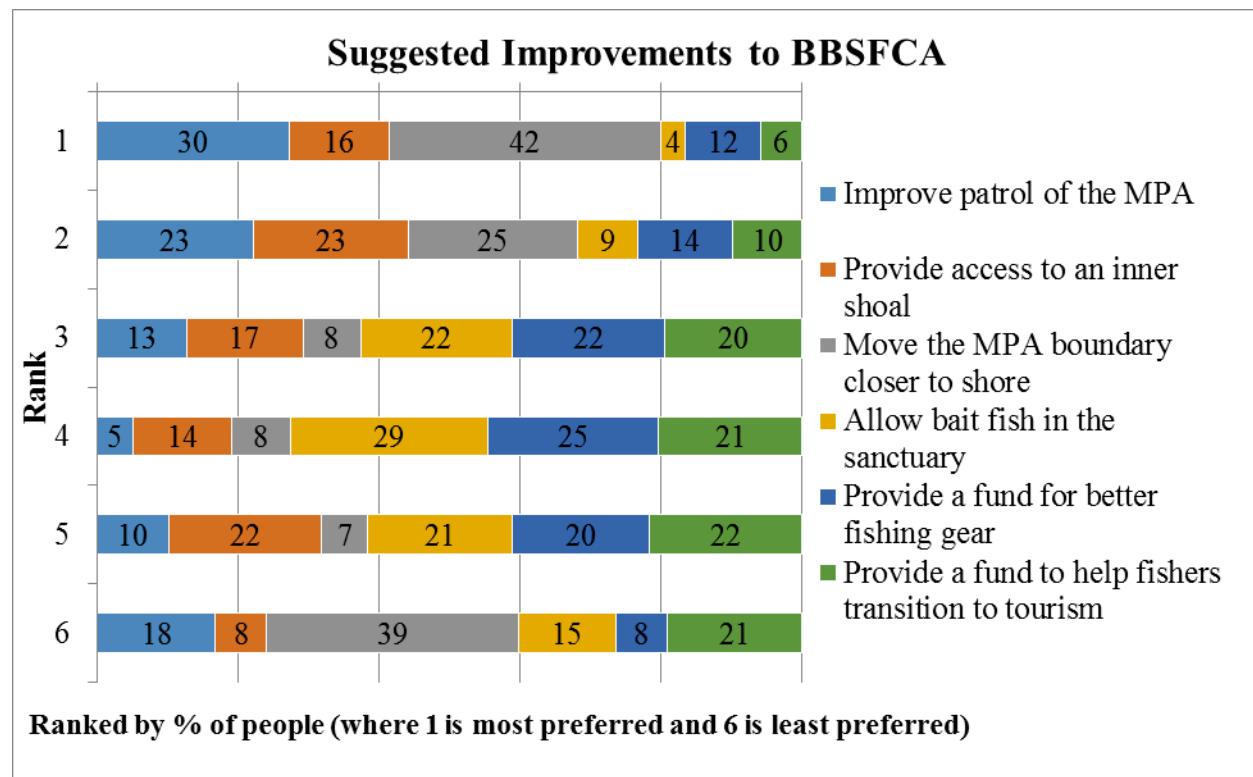


**Figure 8.4 Rankings of suggested improvements to the BBSFCA (n=77 fishers).**

Of surveyed fishers, 42% thought that moving the sanctuary's boundaries closer to shore would be the best improvement, while 16% preferred being granted access to one of the inner shoals (i.e., a submerged sandbank with coral). As reflected in Figure 8.2 (about decision-making power, p. 141), ideas on how to improve the BBSFCA demonstrate a noticeable divergence of interest, as 39% of fishers also ranked moving MPA boundaries as least important. Again, these data highlight conflicting priorities across different community groups. This

difference likely emerged between inshore fishers, who have a demonstrated interest in MPA boundaries (discussed in Chapter 7), and offshore fishers, who do not fish near the sanctuary and therefore have no vested interest in where its boundaries lie.  Limitations of questionnaire data (see Chap 4.7) prevent the statistical confirmation of this argument.  In addition to spatial boundaries, some fishers expressed interest in changing temporal restrictions:

> I know they have a lot of fish in there, so it's important for all the fishermen, not just for me alone.  Every day they pray, just give us a month or two in there, and then you can close it again for four, five, or six years, no problem. (15)

And, "Based on the amount [of fish] that are in the sanctuary, more are supposed to be coming out.  If they could, say every five years then, allow us to go in and catch the bigger fish, that would be better" (18)—although, the potential ecological impact of this change to the MPA is unclear.  Envisioning changes to the spatial and temporal boundaries of the MPA is not surprising, given how many inshore fishers have said that current boundaries are negatively impacting their ability to access provisioning (e.g., fish and sea life) and cultural ES (e.g., knowledge systems, heritage values) (Chap 5.2).  As previously addressed, this decline in ES access has detracted from the material, relational, and subjective wellbeing of many inshore fishers (Chap 7.3.1).  These findings suggest that to increase acceptance and compliance at the community level, a diverse range of actor groups must be consulted in the planning of no-take MPAs.  Community participation in siting and design (more in Sec 8.2.3) will support efforts to identify and preserve access to important ES.  Meaningful participation would foster a sense of investment in MPA outcomes, and ensure that key community actors feel represented in governance processes.

Fishers also expressed concern over the enforcement of the MPA—30% ranked changes in patrol of the BBSFCA by wardens as the greatest priority for improving the BBSFCA (n=77 fishers) (Figure 8.4).  Fishers noted that illegal fishing was one of their greatest barriers to achieving wellbeing, and this concern was shared across most groups, as 53% of surveyed fishers selected illegal fishing as one of their top three barriers to achieving wellbeing (Figure 8.5).  In their interviews, community members requested increased patrol frequency and greater equity in enforcement procedures.  Fishers have suggested that illegal fishing by fishers from both within

the community and outside of the community (e.g., from Savannah-la-Mar, a nearby town) still occurs in the sanctuary, particularly at night: "For it to be better, if they can get rid of the divers, and the night...you have fishermen who go in the sanctuary illegally at nights" (22). Hence, some suggestions from community members related to changes in enforcement:

> I mean more people to guard it…[people] still go in there to steal and fish.
> And maybe it's not—maybe somebody doesn't really have a chance to
> escape to catch fish so easily because if this person is on shift and another
> person goes on shift at another time during the night until the morning
> light the boat keeps patrolling the area. (16)
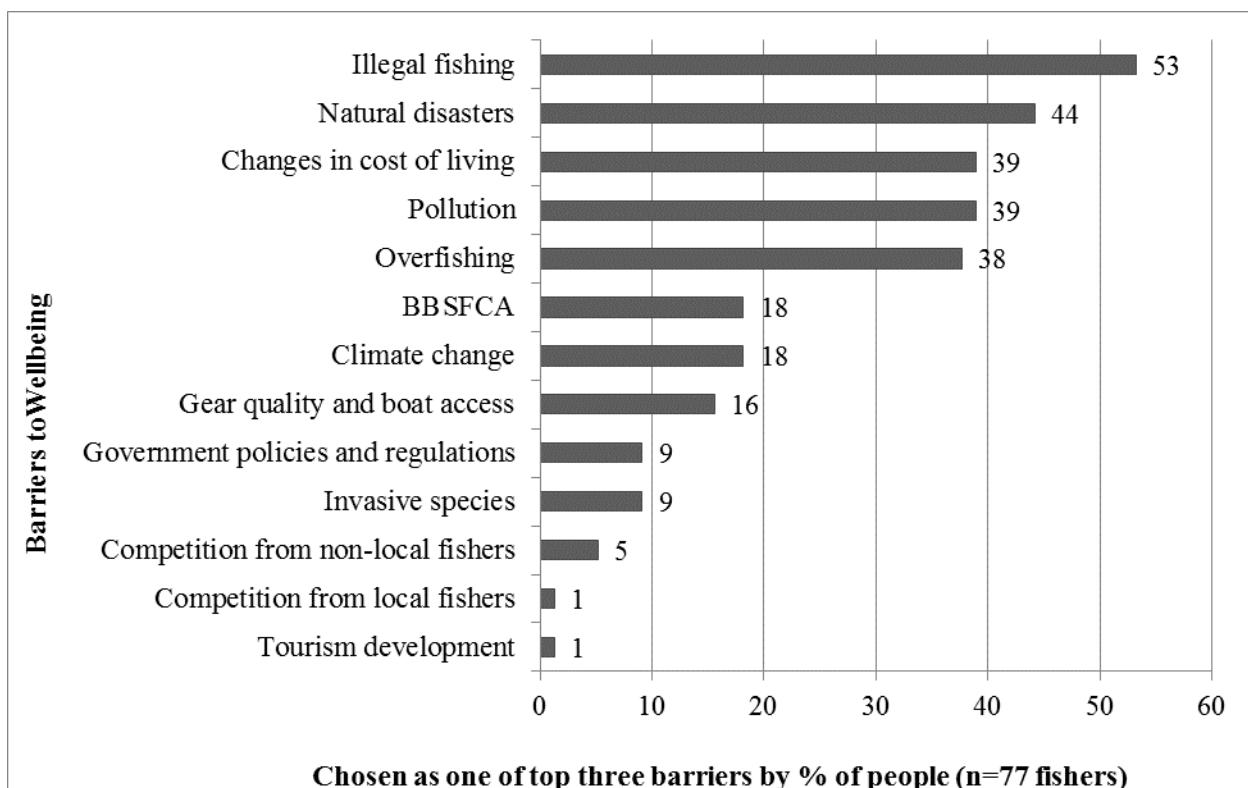


**Figure 8.5 Top three barriers to wellbeing, as chosen by fishers in Bluefields.**

One fisher even proposed using a different tactic: "[The wardens] should have to sleep out there, anchor the boat nearby and look out if anybody [is in the sanctuary]" (9). In addition to illegal fishing, fishers outside of the district of Belmont have implied that current enforcement practices are inequitable:

152

The sanctuary is good, because the fish breed in there. When the fish get big, then they go out. But it doesn't make sense that some persons can go in there and others can't…if you allow the other persons to fish on the inside, the persons who are fishing on the outside won't get anything because they're catching everything inside….So it must be cut out for everyone. (27)

Concerns over security of the MPA point to a "shared recognition of a resources use problem" (Pomeroy et al., 2004, p. 443).

Many fishers acknowledge that illegal fishing undermines the production of ES in the BBSFCA. For example, illegal fishing in the sanctuary prevents habitat recovery, a supporting ES (Chap 5.3.1), and the recovery of fish populations, a provisioning ES (Chap 5.1.1). Yet, these concerns also imply that resource users feel incapable of enforcing management rules on their own, thereby failing to achieve condition six for successful co-management (Pomeroy et al., 2004). The process of community enforcement requires cohesion (e.g., so that members adhere to social norms), trust, and confidence that activities can be reported anonymously in an "informer fi dead" culture (Chap 3.4.1). To promote community enforcement of MPA rules, aspects of relational and subjective wellbeing must be addressed. For example, the BBFFS could become more transparent in their funding, spending, and activities to bolster trust (Chap 6.2.2.2) and social legitimacy of local institutions (Chap 6.2.2). Many fishers expressed distrust in the BBFFS, which became detrimentally conflated with negative opinions and inaction (e.g., not reporting illegal activities) towards the BBSFCA. Likewise, regular visits by the BBFFS to surrounding fishing districts could enhance relational wellbeing by improving intra-community relationships and vertical linkages (i.e., between districts and localized authority). Further, the BBFFS could establish a formal communication channel between itself and the community—for example, by fostering the election of district representatives. This process would not only provide opportunity for engagement and advocacy (Chap 6.2.2.1), but also could facilitate and catalyze the participation of marginalized groups (e.g., Paradise, Auldayr).

### 8.2.3 Participation

Many fishers and community members recognize and appreciate the potential benefits of the MPA: "I see that [the sanctuary] increased the quality of life of a lot of people because the fish

are not molested and plenty fish come inside now so I see that it is a good thing" (23). In fact, when questioned about the purpose of the BBSFCA, there was an overwhelming consensus that the sanctuary was in place to protect fish (ranked as first by 64% of fishers, n=77 fishers), as opposed to being part of a government agenda (Figure 8.6). Questionnaire results also indicated recognition of the bequest cultural ES values of the MPA (ranked as second by 62% of fishers, n=77 fishers). Moreover, fishers have indicated shared concern over natural disasters, pollution, and issues of overfishing—chosen as barriers to wellbeing by 44%, 39%, and 38% of surveyed fishers, respectively (n=77 fishers) (Figure 8.5, above). Again, these findings support a shared recognition of the growing need to protect the coastal-marine ecosystem and associated ES (e.g., fish, tourism, habitat)—a condition for successful co-management (Pomeroy et al., 2004).
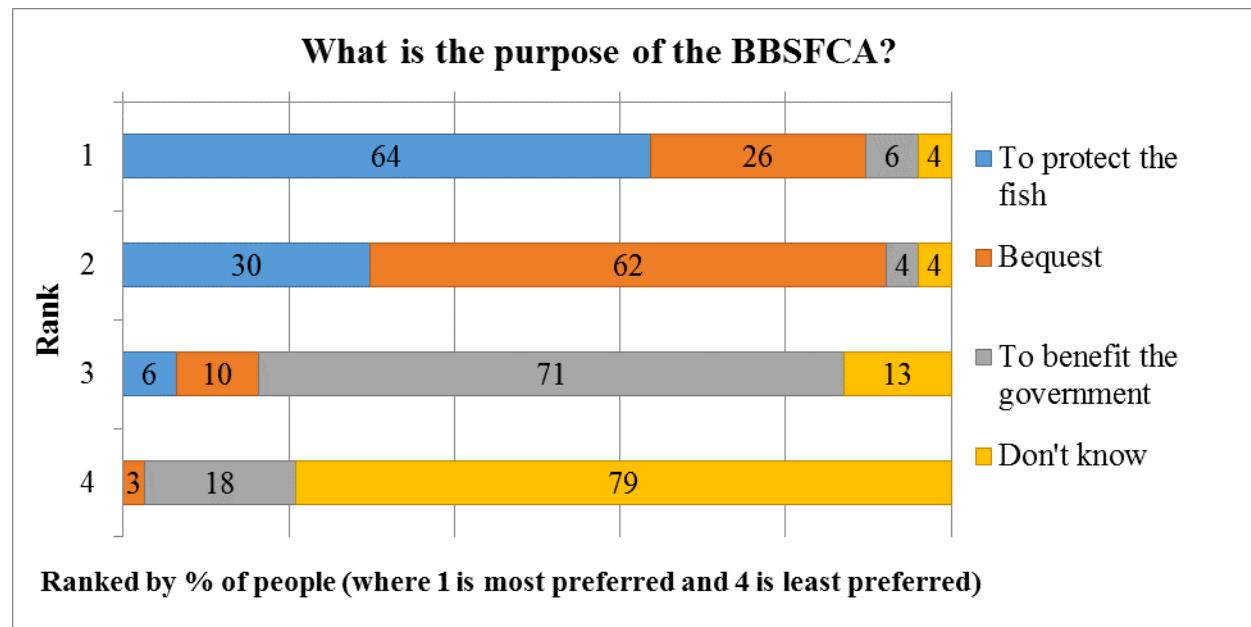


**Figure 8.6 Community rankings of the perceived purpose of the BBSFCA (n=77 fishers).**

However, despite supporting the idea of the MPA, remarks about the location of the BBSFCA reflect a "not in my backyard" (NIMBY) attitude (first introduced in Chap 3.4.2):

> You target the morass side, and you build your sanctuary, no one goes out there. But you cannot target someone's yard, or where the fishermen go every day and make their livelihood…you cannot build a sanctuary in someone's backyard. The fishermen are not the problem; the people who built the sanctuary are the problem, because they don't think about us. (15)

154

NIMBY syndrome is defined as "the protectionist attitudes of and oppositional tactics adopted by community groups facing an unwelcome development in their neighbourhood" (Dear, 1992, p. 288). Research suggests that NIMBYism can create conflict between different actor groups (e.g., between those "for" and those "against") (Sun, Yung, et al., 2016; Sun, Zhu, et al., 2016), thereby negatively impacting relational wellbeing. Participation and communication have been cited as key tools for navigating and overcoming NIMBY conflicts (Sun, Yung, et al., 2016; Sun, Zhu, et al., 2016). Moreover, high quality participatory processes can also improve community perceptions of MPA performance (Dalton et al., 2012).

Nonetheless, participation in the governance of the BBSFCA has been limited. For example, fishers were not involved in determining the boundaries of the MPA or usage rules, and are currently not involved in enforcement. In fact, questionnaire results revealed that 66% of surveyed fishers claimed they were not even consulted about the sanctuary before it was implemented (n=77 fishers). Further, of the 26 fishers who were consulted prior to MPA implementation, 16 felt that the sanctuary was not what they had been led to expect (e.g., some thought that the sanctuary would only be in place for five years, others thought that the boundaries would be closer to shore). While questionnaires administered prior to MPA implementation indicated that 99% of surveyed fishers supported the MPA (Kristos, 2013), some now feel that they were purposely left out of early scoping stages:

> You cannot build a sanctuary with a guy that's fishing on the bank, and the guy that has the big fucking boat out; you have to build it with the guys that are fishing on the inside here. All of the guys that fish on the bank, they will say, "Yeah, build a sanctuary"….they spoke to the bigger fishermen—the guys that they made plans with, the ones fishing on the banks and those guys. But you have to speak to the fisherman that is fishing on the harbour. (15)

Participation issues highlight a failure to achieve two of the conditions for successful co-management, since: 1) membership of all actor groups has not been formally acknowledged or recognized; and 2) there is inadequate communication and networking between these groups (discussed in the following subsection) (Pomeroy et al., 2004).

Dalton et al. (2012) identified that individual decisions to participate in MPA governance can be influenced by demographics (e.g., age, gender, material wellbeing [Chap 6.1]),

membership in organized groups (e.g., BBFFS, relational wellbeing [Chap 6.2]), and the length of residence in a community (e.g., sense of place and identity, subjective wellbeing [Chap 6.3]). This case study adds to this list, as fishing method and geospatial location have also emerged as challenges affecting participation (Chapter 7). A key finding from this research is that inshore fishers have suffered the greatest declines in ES access and social wellbeing since MPA implementation (Chap 7.3.1). Yet, inshore fishers are also the most marginalized in participation processes. BBFFS meetings take place in Belmont, even though many fishers are from districts scattered throughout Bluefields. Fishers from outside of Belmont stated that there is a lack of communication and network connections between districts (discussed next), which inhibits participation: "Nobody came. No one came and asked anyone anything. When things are happening, you hear, but by then it's too late, you didn't realize it; they should come and tell people what's happening before" (25). Another issue for participation is low capacity. As discussed in previous chapters, inshore fishers often live day-to-day, and as such, cannot always find time to attend meetings: "No, they told us to come to a meeting at Belmont, or something like that, and we didn't go. We were at sea" (26). Participation is an opportunity to enhance perceptions and social legitimacy of the BBSFCA, but to do so, participatory processes must become more inclusive—for example, by rotating meeting locations, or by providing an incentive for fishers to travel and attend meetings.

**8.2.4 Networks**

Other conditions for co-management success in the Caribbean are communication amongst stakeholders and adequate networking (Pomeroy et al., 2004). Taken one step further, Alexander et al. (2015, p. 213) found that initiating a transition to co-management in Jamaican MPAs was best supported by a combination of three network structure attributes: "1) the presence and position of institutional entrepreneurs; 2) a dense central core of network actors; and 3) the prevalence of horizontal ties and vertical linkages held by the community based organizations formally responsible for the management" of marine reserves—these attributes were present in Bluefields (Alexander et al., 2015). However, Alexander et al. (2015) also noted that while

initially serving as opportunities towards co-management, these attributes could later transform into challenges (e.g., polarizing qualities of institutional entrepreneurs).

As a lens, a social relational network perspective provides opportunity to understand a number of governance challenges that were previously discussed, including: 1) decision-making regarding location and boundaries of MPAs; 2) participation in MPA planning meetings; 3) monitoring and evaluation of MPA goals and targets; and 4) norms associated with MPA compliance (Alexander & Armitage, 2015).  In the social network of Bluefields, Alexander et al. (2015) found: 1) cohesive subgroups, with a single more dominant subgroup; 2) a higher degree of centrality of the BBFFS in comparison to two other Jamaican MPAs; and 3) low cohesion. Data from this research on relational wellbeing (Chap 6.2) support these findings, while also suggesting that network cohesion is in decline, particularly where inshore fishers are involved (Chap 7.3.1).  Fishers are becoming increasingly insulated within their close circles (subgroups, typically kin-based or district-based) (Chap 6.2.1.2).  The dominant subgroup (presumably that of Belmont, per this research) reiterates that other groups may lack the organizational and relational capacity to assert their demands for resource management (discussed in Chap 6.2.2.1). Further, while higher centrality (i.e., number of horizontal and vertical linkages) may serve the BBFFS in managing the BBSFCA, it also concentrates power and social capital in the hands of few (i.e., wardens and BBFFS manager)—whom, as previously established, are not recognized as representative of all fishers in Bluefields (Sec 8.2).  Discussed earlier (Chap 6.2.2.2), a lack of trust amongst districts and the dominant local fisher institution (i.e., BBFFS) continues to act as a wedge in relational wellbeing at the community level.  These findings reiterate points made in Section 8.2.2 & 8.2.3, suggesting that low relational wellbeing inhibits MPA governance (e.g., decision-making, participation, monitoring) and, consequently, the protection of coastal-marine ecosystem services.

## 8.3 Chapter Summary

In summarizing analysis of state-based governance (Sec 8.1.1), community-based resource management (Sec 8.1.2), and co-management (Sec 8.1.3), co-management has emerged as the mode of MPA governance that is most likely to enhance conservation success.  Furthermore,

relational wellbeing has materialized as a cornerstone to the success of MPA governance.  Data from this research highlights some conflicting objectives and priorities among different community groups, which currently inhibits effective governance of the BBSFCA.  For example, when questioned about who should make decisions about the sanctuary, "government" was ranked consistently as both the first and the last preference (Figure 8.2, above)—similar results emerged for suggested improvements to the sanctuary (Figure 8.4, above).   Divided preference for state-based and community-based governance, and the poor fit of either modes of governance in Bluefields, indicates that co-management may be an appropriate compromise (Sec 8.1.3).

As indicated in Chapter 7, not all actors hold equal stake in the BBSFCA.  Inshore fishers, for example, have experienced the greatest loss of ES access, and subsequently, the greatest decline in social wellbeing (Chap 7.3.1).  To succeed in co-management of the BBSFCA, Bluefields must navigate issues of management objectives (Sec 8.2.2), participation (Sec 8.2.3), and social networks (Sec 8.2.4), while making efforts to be more inclusive of marginalized and affected groups (e.g., inshore fishers, fishers from districts outside of Belmont) in these processes.  In the absence of strategies for alternative livelihood transitions, early participation of all fishers in the siting and design of the BBSFCA (e.g., deciding on closer boundaries, management strategies) may have mitigated some of the MPA's current negative impacts.  However, at present, the success of the BBSFCA rests on enhancing relational wellbeing to promote legitimacy of local institutions, advocacy of marginalized groups, and community participation in monitoring and enforcement.

# Chapter 9
# Conclusion

I offer in this chapter a summary of research findings, key insights, contributions, and areas for future research. I begin by reviewing the objectives for this thesis, alongside a summary of relevant points from chapters in which each objective was addressed. I emphasize key insights on ecosystem services, social wellbeing, and MPA governance in the context of small-scale fisheries. Building on these insights, I present the conceptual, empirical, and practical contributions of this research. Finally, I conclude this chapter with an examination of opportunities for future research.

## 9.1 Thesis Context

Oceans and coastal communities are facing vast changes. Some of these changes include the effects of climate change—sea level rise, increased sea surface temperature, increasing storm intensity—biodiversity loss, marginalization, and the overexploitation of natural resources (Bryant et al., 2011; Butchart et al., 2010; Jackson, 2001; Nayak et al., 2014; Rockström, 2009). To protect the ocean and its resources, governments and organizations around the world are collaborating to create a network of marine protected areas (MPAs) (see Chapter 1). In some cases, however, these MPAs are hastily planned without the acknowledgement of or consultation with adjacent communities. While MPAs have a demonstrated potential for ecological recovery (Hargreaves-Allen et al., 2011; Selig & Bruno, 2010), the social benefits for coastal communities are questionable—or, as some argue, detrimental when MPAs neglect local context (Bennett & Dearden, 2014) (see Chapter 2).

This case study, in Bluefields, Jamaica, highlights MPA governance in the context of small-scale fisheries (see Chapter 3). Through applying ecosystem services (i.e., the benefits people receive from coastal-marine ecosystems [Chap 2.2]) and social wellbeing (i.e., material, relational, and subjective dimensions of wellbeing [Chap 2.3]) as conceptual lenses, this research aims to uncover the challenges and opportunities of MPA governance in small-scale fishing communities. Identifying issues of MPA governance is a critical step for mitigating the trade-

offs between conservation and the wellbeing of small-scale fishing communities in Jamaica. With the expansion of its protected area network, Jamaica is pushing to meet regional Caribbean Challenge Initiative conservation targets (i.e., 20% marine area protection) (CCI, 2013).  In tandem with Jamaican efforts, countries around the world are implementing MPAs to achieve Aichi Biodiversity targets (i.e., 10% marine area protection) (CBD, 2013).  Thus, the results of this research may have applications for MPA governance in the Caribbean and beyond.

## 9.2 Thesis Summary

In this section, I summarize the main findings for each objective of this thesis (Table 9.1).  To address these objectives, this research took a qualitative approach that incorporated both inductive (e.g., forming new coding categories as themes emerged) and deductive analysis (e.g., identifying themes and coding categories based on data from literature review).  Specifically, methods included: 1) literature review; 2) participant observation and scoping; 3) semi-structured interviews (42); 4) focus groups (six), and 5) structured interviewer-administered questionnaires (77) (see Chapter 4).

**Table 9.1 Research objectives, paired with the chapter(s) where each objective is addressed.**

| Objective | Chapters Where Addressed |
|---|---|
| 1) Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers). | 5 |
| 2) Define how marine protected areas (MPAs) have changed access to these bundles for each group. | 7 |
| 3) Examine how changes in access to these bundles have affected social wellbeing (SW) (i.e., material, subjective, and relational wellbeing). | 6, 7 |
| 4) Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management). | 8 |

### 9.2.1 Objective One

*Identify the ecosystem service (ES) bundles that are valued by different community groups (e.g., inshore fishers, offshore fishers, non-fishers).*

Out of provisioning, cultural, regulating, and supporting ES, both fishers and non-fishers in Bluefields acknowledged provisioning and cultural ecosystem services as the primary categories of importance.  The single ecosystem service of notable importance for community members was

fish, which was mentioned in 100% of interviews. Some of the benefits provided by fish in Bluefields include nutrition, livelihood, culture, and enjoyment from eating, fishing, or sharing. Other provisioning ES that were mentioned as important include other sea life (e.g., lobster, conch), raw materials for art and decoration, and abiotic and medicinal resources (Chap 5.1). For cultural services, recreation and leisure, and aesthetic value emerged as the two most important benefits (both were mentioned in 67% of interviews). Other identified cultural ES included cultural heritage value, knowledge systems and educational value, tourism, and spiritual and religious value (Chap 5.2). While habitat and refugia, an important supporting ES, was mentioned in 74% of interviews, the diversity of responses relating to supporting services was much lower than that of provisioning and cultural ES categories. Water cycling and biodiversity were also noted as recognized benefits. However, both these supporting ES were mentioned in less than 10% of interviews (Chap 5.3). Likewise, regulating services, which included weather and storm mitigation, and coastal erosion prevention, were mentioned in only 14% of interviews (Chap 5.4). These findings suggest that to better support supporting small-scale fishing communities, consideration of important provisioning and cultural ES should be incorporated with other knowledge and data (e.g., from technical experts, government) during decision-making. Further, governance processes should be transparent and communicated effectively with communities.

In assessing ecosystem service bundles, several bundles stand out: 1) provisioning-cultural bundles, like the fundamental association of fish with culture and way of life; 2) supporting-provisioning bundles, like the importance of habitat and refugia for supporting fish stocks, or the role of biodiversity in increasing the resilience of fish stocks; and 3) supporting-cultural bundles, like the role of habitat and refugia in fostering a sense of place, enhancing aesthetic value, and providing bequest values (see Figure 5.8 for more). The presence of ecosystem service bundles suggests that the complex linkages between ES should be acknowledged in MPA governance. For example, governing authorities must recognize that fish is more than just a livelihood, and that the cultural benefits of fish are much more difficult to replace than its material benefits.

161

### 9.2.2 Objective Two

*Define how a marine protected area (MPA) has changed access to these bundles for each group.*

The community group most impacted by the Bluefields Bay Special Fishery Conservation Area (BBSFCA) is inshore fishers. Inshore fishers are those who fish for coral reef finfish, lobster, or conch near the coast using spear guns, nets, and pots. Inshore fishers typically have limited or no access to large engine boats—in fact, some fishers own or share a canoe, while others swim out directly from the shore (see Chap 3.2). The BBSFCA is sited in an inshore area, and spans upwards of five fishing grounds that were once frequented by this fisher group. Traveling to fishing areas located farther away can be a challenge for many inshore fishers, since they often lack the resources to do so. Moreover, shifting fishing pressure from inshore to offshore could be unsustainable in the future, and is therefore not a viable long-term solution. As such, inshore fishers have expressed a loss of access to key provisioning (e.g., fish and sea life) and cultural ES (e.g., cultural heritage, traditional knowledge systems) since the implementation of the BBSFCA (see Chapter 7).

Offshore fishers, on the other hand, have remained relatively blasé about the BBSFCA. These fishers have access to resources (e.g., large engine, sturdy boat, gas) that allow them to fish for deep-sea pelagics, or travel to more lucrative offshore banks (see Chap 3.2). Of the few MPA impacts mentioned by offshore fishers, most have been positive. For example, some offshore fishers discussed the spillover effect, which is tangential to habitat and refugia. Theoretically, if fish stocks are given opportunity to recover in MPAs (i.e., a protected habitat and refugia), they could later "spill" out of MPA boundaries to benefit fishers fishing on the outside. Spillover effects have been found in other parts of the world (e.g., McClanahan & Mangi, 2000; Stobart et al., 2009), although one study has indicated that the presence of spillover is not universal and depends on external habitat factors (Forcada et al., 2009). The phenomenon has not been well studied in the Caribbean context (Chap 5.3.1). Finally, like offshore fishers, many non-fishers have voiced either apathy or support for the MPA, stating that it will ensure the future of fish for their families, and the enrichment of aesthetic cultural ES values.

These findings suggest the need to incorporate the voices of inshore fishers in MPA governance. This community group has indicated a much higher stake in the MPA in comparison to other actors, and has experienced the greatest changes to ES access since MPA implementation. The perceived exclusion by some of these fishers from governance processes is a source of conflict and a barrier to capacity building.

### 9.2.3 Objective Three

*Examine how changes in access to these bundles have affected social*
*wellbeing (SW) (i.e., material, subjective, and relational wellbeing).*

Impacts by the BBSFCA on social wellbeing correlate with the impacts that the MPA has on ES access. For example, inshore fishers have experienced a decline in ES access, and have correspondingly experienced a decline in social wellbeing (Chap 7.3.1). This community group expressed difficulties accessing major ES bundles (mentioned in Sec 9.2.1) that correspond to social wellbeing, including: 1) fish as a food, income source, and as a culture and way of life; 2) habitat and refugia as a sense of place and sense of identity; and 3) habitat and refugia as proponents of fish "spillover". In turn, inshore fishers feel that their livelihoods and way of life are being threatened. In addition to a loss of culture and financial strain, spear fishers have reported that they are forced to take increasingly greater risks to catch fish, even though the physical risks of spear fishing are already numerous (Chap 6.1.1.3). Therefore, inshore fishers have struggled to maintain all three dimensions of social wellbeing: 1) material (e.g., reduced income, risks to personal health); 2) relational (e.g., conflict with family, conflict with authorities); and 3) subjective (e.g., loss of identity, feelings of failure, life satisfaction gap).

Offshore fishers and non-fishers, on the other hand, have reported mostly positive changes or no change. For offshore fishers, the BBSFCA is of little consequence to provisioning ES access (Chap 7.3.2). Offshore fishers fish far from the coastline using pots and lines. Therefore, they do not have direct dependence on the fishing grounds inside of the BBSFCA. Some offshore fishers believe that the BBSFCA benefits them, because the protected area allows fish stocks to recover and breed, and eventually "spill out" to offshore areas. Likewise, since their way of life has not been interrupted, cultural ES access remains unchanged for this

community group. Non-fishers have commented that the MPA has enhanced biodiversity, noting that certain species of birds and sea life have returned, thereby improving the aesthetic values of the area. Non-fishers have also noted appreciation for the MPA's bequest values, which ensures the production of ecosystem services for future generations. Other non-fishers have expressed indifference towards the protected area (Chap 7.3.3). For both offshore fishers and non-fishers, changes to social wellbeing have been either neutral or positive, for example: 1) material wellbeing may increase from better catch for offshore fishers, or increased tourism interest for certain non-fishers working in the tourism industry; 2) subjective wellbeing may increase from positive feelings of hope for the future.

In Chapter 7, I discussed ES-SW linkages, while emphasizing the importance of "for whom" in policy analysis. This analysis demonstrated that the BBSFCA does not benefit the community group that once depended on it the most—namely, inshore fishers. In fact, the social wellbeing of many inshore fishers has suffered since MPA implementation. Instead, mainly community groups holding fewer stakes in inshore coastal-marine resources have noticed the short-term benefits of the protected area. Arguably, the long-term benefits of the protected area (e.g., fish for future generations) will be reaped by all community members. However, in the short term, governance issues have emerged from conflicts over the "for whom" of the MPA. These conflicts inhibit conservation success and community compliance, thereby threatening the long-term future of the MPA. Who is the MPA for? This thesis suggests the success of the BBSFCA may rest on convincing inshore fishers that the MPA is "for them" and not "for they" (see Chap 6.2.2.1).

### 9.2.4 Objective Four

*Link ES and SW data to enhance the governance of MPAs (e.g., siting, design, management).*

After analyzing the challenges and preferences for MPA governance, I argued that co-management would be a "best fit" mode of governance for the BBSFCA in Bluefields. Presently, while broader governance processes reflect aspects of both consultative and delegated co-management, day-to-day practices of the BBSFCA mirror community-based resource

management.  Certain community members are intricately involved in the management of the MPA.  However, in Chapter 8, I assert that MPA governance must steer towards being more inclusive of marginalized community groups—in particular, inshore fishers, who are the most impacted by the BBSFCA (Chapter 7).  In the context of conditions for co-management success (Chap 8.2.1), challenges and opportunities for the current transition towards co-management include: 1) mismatched management objectives; 2) a lack of communication and opportunity for participation; and 3) disconnected social networks.

As a no-take zone, the BBSFCA is currently being managed for maximal ecological recovery.  These management objectives have largely neglected the social context of the MPA, and those who depend on it (Chap 8.2.2).  Regarding specific management strategies, community members suggested that monitoring and enforcement of sanctuary rules should be more rigorous. In rebuttal, one warden said that the community should take onus in enforcement (e.g., by reporting illegal fishing).  Yet, as discussed in Chapter 3, Jamaica's "informer fi dead" culture discourages community-based enforcement of the law, since many Jamaicans fear retaliation (Chap 3.4.1).  Fishers noted that fishing still takes place in the sanctuary, particularly at night. Yet, wardens of the sanctuary do not have the capacity to catch all incidents of illegal fishing. To enhance institutional capacity, this research proposes funneling attention towards improving relational wellbeing—for example, the facilitation of open communication amongst actors (to improve trust within the community and encourage community enforcement), and the "scaling up" of governance processes to obtain state support.

In addition, data from this thesis advocate for the early participation of all community groups in MPA planning (Chap 8.2.3).  At this stage, the rules and boundaries of the BBSFCA are unlikely to change.  Irrespective of the no-take rule, ES-SW linkages may have been better preserved if all actors had participated in the siting and design of the BBSFCA.  For example, if inshore fishers had been involved in the siting process, the boundaries of the sanctuary could have been negotiated to maintain ES access.  At present, nearly all inshore fishers have stated that the sanctuary's boundaries are too far from shore, leading to increased personal risk (e.g., from deep diving) and greater resource expenditure and financial risk (e.g., gas to travel farther out, despite uncertainty over catch).  While sanctuary leaders argued that parts of the sanctuary

165

are shallow, they were perhaps unaware that these shallower parts of the MPA are not fishable habitats (as argued by inshore fishers).  These conflicting arguments highlight a lack of communication between MPA managers and fisher groups.  Ultimately, however, it may be near impossible to reconcile the paradox of what is best for the ecological future versus and what is needed in the social present.  Inshore fishers, despite sharing recognition of resource use issues (e.g., overfishing, illegal fishing) (Chap 8.2.2, Figure 8.5), still maintain that they must fish to survive.  Notably, while moving boundaries and changing access rules may serve to enhance their wellbeing, these changes could be ecologically unsustainable in the long-term.  For example, as it is, research has pointed to the fact that 40-64% of eastern Caribbean MPAs do not have boundaries that are expansive enough to protect all reef fish (Pittman et al., 2014).

Finally, this research notes the importance of social networks in MPA governance (Chap 8.2.4).  In the case of Bluefields, better connectivity is required from within the community. Certain community groups have become isolated within their "close circle"—for example, fishers from Black's Bay, Paradise, and Auldayr all mentioned a sense of alienation in the larger context of the Bluefields Bay Fishermen's Friendly Society (BBFFS).  Isolation of community groups weakens local fisher institutions by inhibiting capacity, trust, and advocacy.  Likewise, there is a need for Bluefields to become more "nested" in other institutions—for example, increased knowledge sharing amongst fisher organizations, more communication with state organizations (e.g., the National Environment & Planning Agency, the Ministry of Agriculture and Fisheries).  Regional networking is necessary for fisheries management, since coastal-marine resources are migratory and fluid in nature.

## 9.3 Contributions

In this section, I discuss the broader conceptual contributions and specific insights of this research to literature.  Then, I examine the applications of this research to policy and practice.

### 9.3.1 Conceptual Framework

The conceptual framework generated for this thesis can be applied in the broad study of other social-ecological systems (Figure 9.1) (see Chap 7.1).  This framework illustrates ecosystem

services and social wellbeing in a cohesive picture that integrates the ecological (i.e., the ecological apex [Chap 7.1.1]) and social context (i.e., the social foundation [Chap 7.1.3]). Therefore, this framework may help to unpack the complexities of various tangible and intangible aspects of ecosystem services, and further enable a novel analysis of how these aspects link to the tangible and intangible dimensions of social wellbeing.
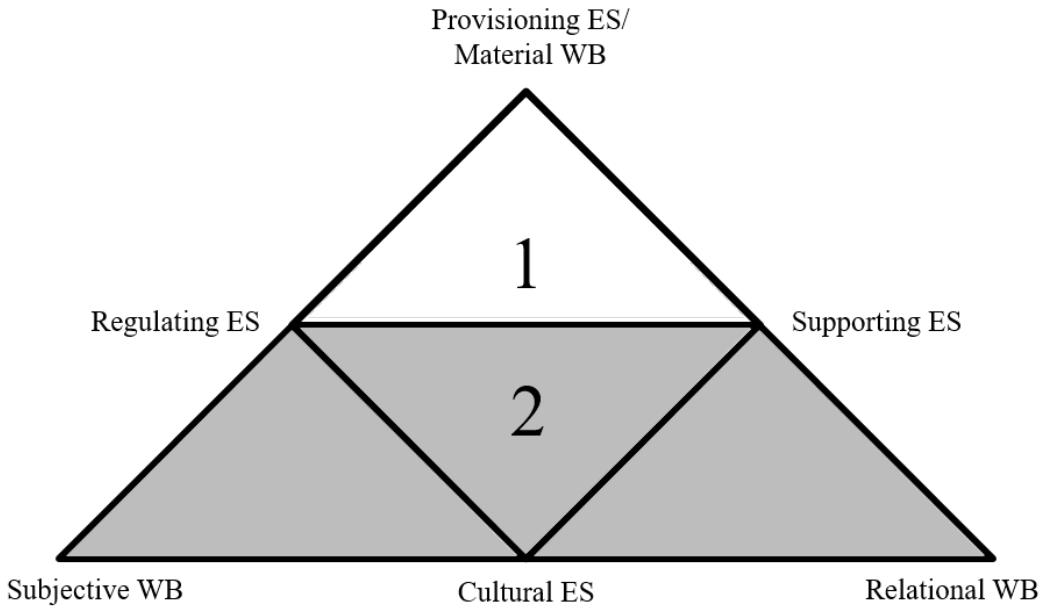


**Figure 9.1 Conceptual framework: a synthesis of ecosystem services and social wellbeing.**

**\*White area (Section 1) is the ecological apex, shaded area (Section 2) is the social foundation**

As demonstrated in this thesis, analyzing linkages between ecosystem services and social wellbeing can highlight and differentiate the diversity of experiences that people have with ecosystems. In understanding these diverse social-ecological experiences, opportunities may emerge for more context-specific approaches to the governance of natural resources.

### 9.3.2 Key Insights

In addition to the empirical data provided in Section 9.2, this thesis offers three key insights into the governance of MPAs in small-scale fishing communities:

1) Fish must be governed as more than just material resources and provisioning ecosystem services, since they also provide vital cultural benefits;

2) Relational wellbeing is a core component in the success of MPA governance, particularly in the context of co-management; and

3) Fishing method and geospatial location are factors that perpetuate the marginalization of certain community groups.

First, fish and sea life are tightly bundled with cultural ecosystem services. Fish and sea life play a foundational role in supporting sense of identity, sense of community, and sense of place. However, in the management of these natural resources, fish are often treated as mere provisioning ecosystem services. For example, while community leaders in Bluefields strive to find alternative livelihoods for fishers in the community, these alternative livelihoods may only replace or supplement material wellbeing. Alternative livelihoods cannot act as a substitute for the rich, cultural narrative that fishers and their families have developed over many generations. As such, alternative livelihoods may not redress the impact of the MPA on relational and subjective wellbeing. In Bluefields, fishing is a way of life, and almost an entity in and of itself—with memory, traditions, and intrinsic value. Governance that fails to pay respect to these intangible values of fish may not succeed in the long-term.

Second, in studying the broader challenges for MPA governance (e.g., institutional capacity, conflict) and the specific challenges in the transition towards MPA co-management (e.g., defining management objectives, participation, social networks), relational wellbeing emerges as a cornerstone in the governance process. Relational wellbeing, at its multiple levels (e.g., family, close circle, local community, regional and national institutions [Figure 6.3]), offers an organized hierarchy through which to examine governance challenges. For example, families and close circles may be important social units in understanding the isolation of certain groups in social networks. Likewise, in identifying these social units, strategies can be formed to "bridge" current gaps at the community level (e.g., to determine the number of representatives required for all actors to feel sufficiently advocated for and represented). Both community-based resource management and co-management acknowledge the importance of nested and linked institutions.

168

At the regional and national level, relational wellbeing can offer insights into community and state collaboration (e.g., the connections or organizational belonging of state representatives in communities). Overall, analysis of multi-level governance could potentially find synergies in overlaying the "relational landscape" of relational wellbeing (Chap 6.2).

Third, this case study has unveiled several factors that perpetuate the marginalization of certain community groups in governance processes, including fishing method and geospatial location. Discussed in an earlier chapter, many community members in Bluefields have a "place-based" sense of community (Chapter 3). Also (again drawing from relational wellbeing [Chap 6.2]), extended members from the same family often live within the same district. Place-based identities are therefore complex, as they are often also kinship-based. While Bluefields is designated as the formal community name, there are many fractured "communities" within (e.g., Black's Bay). These distinct groups can become both socially and physically isolated (e.g., fishers from Paradise may not have the resources to attend a meeting in Belmont, which is approximately 15-20 minutes by car). "Place" in Bluefields, however, has more than social implications. In Jamaica, "place" can hugely influence socioeconomics. For example, communities such as Auldayr and Paradise—located far from aesthetic coastlines—cannot profit from tourism to the same extent as Belmont. While many members within these districts may work in tourism, these individuals commute or out-migrate. There is no infrastructure in these districts to support tourism, and few points of interest for many tourists who choose to visit Jamaica. Lacking aesthetic value and charisma, these districts also draw less interest from foreign aid. Districts (or "communities") such as Auldayr and Paradise have a disproportionately high number of inshore fishers, since inshore fishing requires less capital (e.g., engine, gas, large boat). Thus, through targeting inshore coastal-marine habitats, the BBSFCA has led to increasing marginalization of already marginalized groups. While the potential for inshore fishers to benefit from future spillover effects is present, research has suggested that these effects may only begin to manifest after a decade (McClanahan & Mangi, 2000). The path that inshore fishers must follow to maintain their wellbeing, in the meantime, is unclear. To achieve long-term success in conservation, governance must steer towards appropriately identifying and supporting marginalized groups.

### 9.3.3 Policy and Practice

From a policy perspective, insights from these data can facilitate the development of an MPA model that is more inclusive of all actors in small-scale fishing communities. For example, in Bluefields, many fishers noted that the MPA requires more rigorous monitoring and enforcement. Yet, at present, there is no legal framework for community members to become involved in deciding sanctions for rule violators, or in conflict resolution over the MPA. More importantly, however, rather than applying one case study's findings directly to other communities, this research advocates that it is advantageous to consult with individual communities (in all senses of the word) in early planning stages, on a case-by-case basis. Whether drawing on comparisons at local, regional, or international scales, communities are diverse and exhibit unique social-ecological contexts. At a foundational level, MPA policies, like the one in Bluefields, originate from top-down international initiatives (e.g., Aichi Biodiversity Targets). These top-down policies may not encompass the sociocultural nuances required for successful implementation. To improve overall success, governance of MPAs should be adaptive (e.g., in Bluefields, the no-take rule and sanctions for rule violators are unlikely to change) and context-specific (e.g., in Bluefields, the MPA does not benefit inshore fishers, who previously depended on it the most). As this case study demonstrates, the progress of conservation may depend on efforts made to engage actors early in the governance process. Early engagement and participation in decision-making could mitigate some of the potential tradeoffs between conservation and the wellbeing of small-scale fishing communities down the road.

## 9.4 Future Research

This thesis points to several opportunities for future research that could build on the contributions discussed in the previous section. Opportunities for future research include:

1) Additional case studies on newly implemented marine protected areas in Jamaica to build on empirical evidence and to identify trends;

2) Application of the ecosystem service and social wellbeing conceptual framework to governance in other contexts; and

3) Strategies on how to identify and engage marginalized communities in the early stages of natural resource use planning.

First, additional case studies on MPA governance in the Jamaican context would not only contribute empirical breadth, but could also serve as evidence that more "bottom-up" governance approaches—in the sense that these approaches would involve all actors, and not just members of the local elite—could produce better social wellbeing outcomes. Consensus from multiple case studies could provide impetus to re-evaluate MPA planning, implementation, and management strategies in Jamaica and the Caribbean region, more broadly.

Second, the conceptual framework for this thesis may be harnessed for use in other contexts—for example, in studying MPA governance in other regions, or in studying the management of terrestrial resources, such as forestry. The body of research on the linkages between ecosystem services and social wellbeing is not large, and as such, application of this framework could provide novel insights into other governance contexts.

Third, while stating that the engagement of marginalized groups in governance was a problem in this thesis, I offered no practical strategies to resolve this issue. Future research could seek to address this problem by identifying the specific barriers that prevent engagement and participation in the context of small-scale fishing communities, and formulating mechanisms to overcome these barriers. For example, the marginalized groups in this case study expressed a lack of capacity to self-organize into effective formal advocacy groups. Additional research could develop consultative tools and participatory mechanisms that better facilitate the articulation of concerns, needs, and ideas of different actor groups.

171

# References

Abecasis, R. C., Schmidt, L., Longnecker, N., & Clifton, J. (2013). Implications of community and stakeholder perceptions of the marine environment and its conservation for MPA management in a small Azorean island. *Ocean and Coastal Management*, *84*, 208–219. http://doi.org/10.1016/j.ocecoaman.2013.08.009

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., Cheung, A. C. K., & Slavin, R. E. (2015). *Living Blue Planet Report. Educational Research Review* (Vol. 9). http://doi.org/10.1016/j.edurev.2013.01.001

Abson, D. J., & Termansen, M. (2011). Valuing ES in terms of ecological risks and returns. *Conservation Biology*, *25*(2), 250–258. http://doi.org/10.1111/j.1523-1739.2010.01623.x

Abunge, C., Coulthard, S., & Daw, T. M. (2013). Connecting marine ecosystem services to human well-being: Insights from participatory well-being assessment in Kenya. *Ambio*, *42*(8), 1010–1021. http://doi.org/10.1007/s13280-013-0456-9

Agrawal, A., & Gibson, C. C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development*, *27*(4), 629–649. http://doi.org/10.1016/S0305-750X(98)00161-2

Aiken, K., Squire, O., Kong, G. A., & Smikle, S. (2011). Creating a Fish Sanctuaries Network in Jamaica , West Indies. *Proceedings of the 64th Gulf and Caribbean Fisheries Institute*, (1983).

Albrecht, G. (2006). Solastalgia. *Alternatives Journal*, *32*(4/5), 34–37.

Alexander, S. M., & Armitage, D. R. (2015). A Social Relational Network Perspective for MPA Science. *Conservation Letters*, *8*(1), 1–13. http://doi.org/10.1111/conl.12090

Alexander, S. M., Armitage, D. R., & Charles, A. T. (2015). Social networks and transitions to co-management in Jamaican marine reserves and small-scale fisheries. *Global Environmental Change*, *35*, 213–225. http://doi.org/10.1016/j.gloenvcha.2015.09.001

Algar, J. (2014, July 2). Parrotfish population decline is putting Caribbean coral reefs at risk. *Tech Times*. New York City. Retrieved from

http://www.techtimes.com/articles/9584/20140702/parrotfish-caribbean-coral-reef-salvation.htm

Allison, E. H., & Ellis, F. (2001). The livelihoods approach and management of small-scale fisheries. *Marine Policy*, *25*, 377–388. http://doi.org/10.1016/S0308-597X(01)00023-9

Angner, E. (2010). Subjective well-being. *Journal of Socio-Economics*, *39*(3), 361–368. http://doi.org/10.1016/j.socec.2009.12.001

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. http://doi.org/10.1093/jopart/mum032

Armitage, D. R. (2005). Adaptive capacity and community-based natural resource management. *Environmental Management*, *35*(6), 703–715. http://doi.org/10.1007/s00267-004-0076-z

Armitage, D. R., Béné, C., Charles, A. T., Johnson, D. S., & Allison, E. H. (2012). The interplay of well-being and resilience in applying a social- ecological perspective. *Ecology and Society*, *17*(4), 15. http://doi.org/10.5751/ES-04940-170415

Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., … Wollenberg, E. K. (2009). Adaptive co-management for social-ecological complexity. *Frontiers in Ecology and the Environment*, *7*(Ma 2005), 95–102. http://doi.org/10.1890/070089

Ayers, A. L., & Kittinger, J. N. (2014). Emergence of co-management governance for Hawai'i coral reef fisheries. *Global Environmental Change*, *28*(1), 251–262. http://doi.org/10.1016/j.gloenvcha.2014.07.006

Bailey, C. A. (2007). Coding, Memoing, and Descriptions. In *A Guide to Qualitative Field Research* (2nd ed., pp. 125–142). Thousand Oaks: Pine Forge Press.

Ban, N. C., Adams, V. M., Almany, G. R., Ban, S., Cinner, J. E., McCook, L. J., … White, A. T. (2011). Designing, implementing and managing marine protected areas: Emerging trends and opportunities for coral reef nations. *Journal of Experimental Marine Biology and Ecology*, *408*(1–2), 21–31. http://doi.org/10.1016/j.jembe.2011.07.023

173

Barbier, E. B., Hacker, S. D., Kennedy, C., Koch, E. W., Stier, A. C., & Silliman, B. R. (2011). The value of estuarine and coastal ecosystem services. *Ecological Monographs*, *81*(2), 169–193. http://doi.org/10.1890/10-1510.1

Barrington-Leigh, C., & Escande, A. (2016). Measuring Progress and Well-Being: A Comparative Review of Indicators. *Social Indicators Research*. http://doi.org/10.1007/s11205-016-1505-0

Basurto, X., & Ostrom, E. (2009). Beyond the tragedy of the commons. *Economia Delle Fonti Di Energia E Dell'ambiente*, 35–60. http://doi.org/10.3280/EFE2009-001004

Batson-Savage, T. (2007). "Hol" Awn Mek a Answer mi Cellular': Sex, Sexuality and the Cellular Phone in Urban Jamaica. *Continuum: Journal of Media & Cultural Studies*, *21*(2), 239–251. http://doi.org/10.1080/10304310701269073

Bavinck, M., Chuenpagdee, R., Diallo, M., van der Haijde, P., Kooiman, J., Mahon, R., & Williams, S. (2005). *Interactive fisheries governance: A guide to better practice*.

Bavington, D. (2010). *Managed Annihilation: An Unnatural History of the Newfoundland Cod Collpase*. Vancouver: UBC Press.

Bavington, D., & Kay, J. J. (2005). Ecosystem-based insights on Northwest Atlantic fisheries in an age of globalization. In M. Schecter, W. Taylor, & L. Wolfson (Eds.), *Globalization: Effects on Fisheries Resources* (pp. 1–41). Cambridge: Cambridge University Press.

Beans, L. (2014). Protecting parrotfish could slow decline of Caribbean coral reefs. Retrieved February 7, 2017, from http://www.ecowatch.com/protecting-parrotfish-could-slow-decline-of-caribbean-coral-reefs-1881930473.html

Béné, C. (2006). *Small-Scale Fisheries: Assessing their contributions to rural livelihoods in delevoping countries*. *FAO Fisheries Circular No. 1008*. Rome, Italy.

Bene, C., & Neiland, A. E. (2006). *From Participation to Governance*. *The Challenge Program on Water and Food*. Penang, Malaysia.

Bennett, E. M., Cundill, G., Lazos, E., Cramer, W., Begossi, A., Egoh, B. N., … Payet, K.

(2015). Linking biodiversity, ecosystem services, and human well-being: three challenges for designing research for sustainability, (APRIL).

Bennett, E. M., Peterson, G. D., & Gordon, L. J. (2009). Understanding relationships among multiple ecosystem services. *Ecology Letters*, *12*(12), 1394–404. http://doi.org/10.1111/j.1461-0248.2009.01387.x

Bennett, N. J., & Dearden, P. (2014). Why local people do not support conservation: Community perceptions of marine protected area livelihood impacts, governance and management in Thailand. *Marine Policy*, *44*, 107–116. http://doi.org/10.1016/j.marpol.2013.08.017

Berkes, F. (2003). Alternatives to conventional management: Lessons from small-scale fisheries. *Environments*, *31*(1), 5–20.

Berkes, F. (2005a). Commons theory for marine resource management in a complex world. *Senri Ethnological Studies*, *67*, 13–31. Retrieved from http://www.umanitoba.ca/institutes/natural_resources/canadaresearchchair/Berkes 2005 commons.05.pdf

Berkes, F. (2005b). Why Keep a Community-Based Focus in Times of Global Interactions? *Topics in Arctic Social Sciences*, *5*, 33–44.

Berkes, F. (2007). Community-based conservation in a globalized world. *Proceedings of the National Academy of Sciences*, *104*(39), 15188–93. http://doi.org/10.1073/pnas.0702098104

Berkes, F. (2009). Evolution of co-management: Role of knowledge generation, bridging organizations and social learning. *Journal of Environmental Management*, *90*(5), 1692–1702. http://doi.org/10.1016/j.jenvman.2008.12.001

Berkes, F., George, P., & Preston, R. J. (1991). Co-management: the evolution in theory and practice of the joint administration of living resources. *Alternatives*, *18*(2), 12–18.

Berkes, F., Hughes, T. P., Steneck, R. S., Wilson, J. A., Bellwood, D. R., Crona, B., … Österblom, H. (2006). Globalization, Roving Bandits, and Marine Resources, *311*(March), 1557–1558.

175

Beveridge, M. C. M., Thilsted, S. H., Phillips, M. J., Metian, M., Troell, M., & Hall, S. J. (2013). Meeting the food and nutrition needs of the poor: The role of fish and the opportunities and challenges emerging from the rise of aquaculture. *Journal of Fish Biology*, *83*(4), 1067–1084. http://doi.org/10.1111/jfb.12187

Biermann, F., Abbott, K., Andresen, S., Backstrand, K., Bernstein, S., Betsill, M. M., … Zondervan, R. (2012). Navigating the Anthropocene: Improving Earth System Governance. *Science*, *335*, 1306–1307.

Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., … Siebenhüner, B. (2009). Earth System Governance: People, Places and the Planet. Science and Implementation Plan of the Earth System Governance Project, (1), 148. http://doi.org/10.1787/9789264203419-101-en

Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., … Zondervan, R. (2010). Earth system governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, *10*(4), 277–298. http://doi.org/10.1007/s10784-010-9137-3

Bijma, J., Pörtner, H. O., Yesson, C., & Rogers, A. D. (2013). Climate change and the oceans - What does the future hold? *Marine Pollution Bulletin*, *74*(2), 495–505. http://doi.org/10.1016/j.marpolbul.2013.07.022

Bijma, J., Yesson, C., Rogers, A. D., Pitcher, T. J., Cheung, W. W. L., Hutchinson, T. H., … Sack, K. (2013). International Programme on the State of the Ocean: Combined Research Papers. *Marine Pollution Bulletin*, *74*. Retrieved from http://www.stateoftheocean.org/pdfs/IPSO-Papers-Combined-15.1.14.pdf

Birkeland, C. (2017). Working with, not against, coral-reef fisheries. *Coral Reefs*, *36*(1), 1–11. http://doi.org/10.1007/s00338-016-1535-8

Blackmore, C. (2009). *Responsible Wellbeing and its Implications for Development Policy* (No. 09/47). Bath. Retrieved from http://opus.bath.ac.uk/15946/

Böhnke-Henrichs, A., Baulcomb, C., Koss, R., Hussain, S. S., & de Groot, R. S. (2013).

Typology and indicators of ecosystem services for marine spatial planning and management. *Journal of Environmental Management*, *130*, 135–145. http://doi.org/10.1016/j.jenvman.2013.08.027

Bourke, B. (2014). The Qualitative Report Positionality: Reflecting on the Research Process Recommended APA Citation. *The Qualitative Report*, *19*(33), 1–9. Retrieved from http://nsuworks.nova.edu/tqr%5Cnhttp://nsuworks.nova.edu/tqr/vol19/iss33/3

Britton, E., & Coulthard, S. (2013). Assessing the social wellbeing of Northern Ireland's fishing society using a three-dimensional approach. *Marine Policy*, *37*(1), 28–36. http://doi.org/10.1016/j.marpol.2012.04.011

Brown, C., & Edwards, S. (2005). *Situation Analysis of Jamaica's Protected Areas System Plan*. Washington D.C.

Brunner, R. D. (2010). Adaptive governance as a reform strategy. *Policy Sciences*, *43*(4), 301–341. http://doi.org/10.1007/s11077-010-9117-z

Bryant, D., Burke, L., McManus, J., & Spalding, M. D. (2011). *Reefs at Risk Revisited. National Geographic*. Washington D.C.

Bryman, A., Teevan, J. J., & Bell, E. (2009a). Interviewing in Qualitative Research. In *Social Research Methods* (2nd Can, pp. 158–184). Toronto: Oxford University Press.

Bryman, A., Teevan, J. J., & Bell, E. (2009b). Qualitative Data Analysis. In *Social Research Methods* (2nd Can., pp. 251–274). Toronto: Oxford University Press.

Bryman, A., Teevan, J. J., & Bell, E. (2009c). Survey Research: Stuctured Interviewing and Questionnaires. In *Social Research Methods* (2nd Can., pp. 63–79). Toronto: Oxford University Press.

Bundy, A., Chuenpagdee, R., Cooley, S., Glaeser, B., & McManus, L. T. (2016). Global change, ensuing vulnerabilities, and social responses in marine environments. *Regional Environmental Change*, *16*(2), 273–276. http://doi.org/10.1007/s10113-015-0906-y

Burke, L., & Maidens, J. (2004). *Reefs at Risk in the Caribbean. Reefs at Risk*. Washington D.C.

Retrieved from http://pdf.wri.org/reefs_caribbean_front.pdf

Butchart, S. H. M., Walpole, M., Collen, B., van Strien, A., Scharlemann, J. P. W., Almond, R. E. A., … Watson, R. (2010). Global biodiversity: indicators of recent declines. *Science*, *328*(5982), 1164–8. http://doi.org/10.1126/science.1187512

C-ARK. (2015). Resilience and Sustainability in Practice: Jamaica.

C-FISH. (2015). Bluefields Bay, Jamaica. Retrieved April 4, 2015, from http://c-fish.org/where-we-work/bluefields-bay/

Camfield, L., Crivello, G., & Woodhead, M. (2009). Wellbeing research in developing countries: Reviewing the role of qualitative methods. *Social Indicators Research*, *90*, 5–31. http://doi.org/10.1007/s11205-008-9310-z

Campbell, D. (2014). Map of the Bluefields Bay Special Fishery Conservation Area. Kingston, Jamaica.

Campbell, L. M., Gray, N. J., Fairbanks, L., Silver, J. J., Gruby, R. L., Dubik, B. A., & Basurto, X. (2016). Global Oceans Governance: New and Emerging Issues. *Annual Review of Environment and Resources*, *41*(1), annurev-environ-102014-021121. http://doi.org/10.1146/annurev-environ-102014-021121

CARIBSAVE. (2012). *The Caribsave Climate Change Risk Atlas (CCCRA): Climate Change Risk Profile for Jamaica*. Christ Church.

CARIBSAVE. (2013). *The Community-Based Live Fish (CLIF) Monitoring Method*. Christ Church.

CARICOM. (2000). *CARICOM Fishery Report No. 4: Jamaica National Marine Fisheries Atlas*. *CARICOM Fishery Report*. Belize City.

Carlsson, L., & Berkes, F. (2005). Co-management: concepts and methodological implications. *Journal of Environmental Management*, *75*(1), 65–76. http://doi.org/10.1016/j.jenvman.2004.11.008

Carney, D. (2003). *Sustainable Livelihoods Approaches: Progress and Possibilities for Change*.

London. Retrieved from
http://www.eldis.org/vfile/upload/1/document/0812/SLA_Progress.pdf

Carstensen-Egwuom, I. (2014). Connecting intersectionality and reflexivity: Methodological
approaches to social positionalities. *Erdkunde*, *68*(4), 265–276.
http://doi.org/10.3112/erdkunde.2014.04.03

Catarci, C. (2004). World markets and industry of selected commercially- exploited aquatic
species with an international conservation profile. *FAO Fisheries Circular*, *990*(990), 186.

CBD. (2013). *Quick Guides to the Aichi Biodiversity Targets (Version 2)*. Montreal. Retrieved
from http://www.cbd.int/nbsap/training/quick-guides/

CBD. (2015). CBD Country Profile: Jamaica. Retrieved September 8, 2015, from
https://www.cbd.int/countries/?country=jm

CCI. (2013). Caribbean Challenge Initiative Leaders Declaration. Necker Island: Caribbean
Challenge Initiative (CCI).

CEP. (2015). Overview of the SPAW Protocol — Caribbean Environment Programme.
Retrieved April 19, 2016, from http://www.cep.unep.org/cartagena-convention/spaw-
protocol

Chahine, M. T. (1992). The hydrological cycle and its influence on climate. *Nature, 359, 6394*.
http://doi.org/10.1038/359373a0

Chakalall, B., Mahon, R., & McConney, P. (1998). Current issues in fisheries governance in the
Caribbean Community (CARICOM). *Marine Policy*, *22*(1), 29–44.
http://doi.org/10.1016/S0308-597X(97)80002-4

Chakalall, B., Mahon, R., McConney, P., Nurse, L., & Oderson, D. (2007). Governance of
fisheries and other living marine resources in the Wider Caribbean. *Fisheries Research*,
*87*(1), 92–99. http://doi.org/10.1016/j.fishres.2007.06.009

Chan, K. M. A., Balvanera, P., Benessaiah, K., Chapman, M., Díaz, S., Gómez-Baggethun, E.,
… Turner, N. (2016). Opinion: Why protect nature? Rethinking values and the

environment. *Proceedings of the National Academy of Sciences*, *113*(6), 1462–1465. http://doi.org/10.1073/pnas.1525002113

Chan, K. M. A., Guerry, A. D., Balvanera, P., Klain, S. C., Satterfield, T. a., Basurto, X., … Woodside, U. (2012). Where are Cultural and Social in Ecosystem Services? A Framework for Constructive Engagement. *BioScience*, *62*(8), 744–756. Retrieved from http://bioscience.oxfordjournals.org/content/62/8/744.full

Chan, K. M. A., Satterfield, T. A., & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics*, *74*, 8–18. http://doi.org/10.1016/j.ecolecon.2011.11.011

Charmaz, K. (2006). *Constructing Grounded Theory* (1st ed.). Thousand Oaks: Sage.

Christie, P. (2004). Marine Protected Areas as Biological Successes and Social Failures in Southeast Asia. *American Fisheries Society*, *42*, 155–164. http://doi.org/10.1016/S0002-9610(03)00290-3

Christie, P., & White, A. T. (2007). Best practices for improved governance of coral reef marine protected areas. *Coral Reefs*, *26*(4), 1047–1056. http://doi.org/10.1007/s00338-007-0235-9

Christie, P., White, A. T., & Deguit, E. (2002). Starting point or solution? Community-based marine protected areas in the Philippines. *Journal of Environmental Management*, *66*(4), 441–454. http://doi.org/10.1006/jema.2002.0595

Cinner, J. E., McClanahan, T. R., MacNeil, M. A., Graham, N. A. J., Daw, T. M., Mukminin, A., … Kuange, J. (2012). Comanagement of coral reef social-ecological systems. *Proceedings of the National Academy of Sciences*, *109*(14), 5219–5222. http://doi.org/10.1073/pnas.1121215109

CIW. (2012). *How are Canadians Really Doing? The 2012 CIW Report*. Waterloo.

Clarke, C. (2015). Educational achievement and wage determination in Jamaica. *Social and Economic Studies*, *64*(3&4), 187–210.

Copestake, J., & Camfield, L. (2009). Measuring subjective wellbeing in Bangaladesh, Ethiopia,

Peru and Thailand using a personal life goal satisfaction approach, (February). Retrieved from http://opus.bath.ac.uk/13945/

Costanza, R., D'Arge, R., de Groot, R. S., Farber, S. C., Grasso, M., Hannon, B., … van den Belt, M. (1997). The value of the world's ecosystem services and natural capital. *Nature*, *387*(6638), 253–260. http://doi.org/10.1038/387253a0

Costanza, R., de Groot, R. S., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., … Turner, R. K. (2014). Changes in the global value of ecosystem services. *Global Environmental Change*, *26*, 152–158. http://doi.org/10.1016/j.gloenvcha.2014.04.002

Coulthard, S. (2012). What does the debate around social wellbeing have to offer sustainable fisheries? *Current Opinion in Environmental Sustainability*, *4*(3), 358–363. http://doi.org/10.1016/j.cosust.2012.06.001

Coulthard, S., Johnson, D. S., & McGregor, J. A. (2011). Poverty, sustainability and human wellbeing: A social wellbeing approach to the global fisheries crisis. *Global Environmental Change*, *21*(2), 453–463. http://doi.org/10.1016/j.gloenvcha.2011.01.003

Cox, M., Arnold, G., & Villamayor-Tomas, S. (2010). A review of design principles for community-based natural resource management. *Ecology and Society*, *(4)*(4), 38. Retrieved from http://www.ecologyandsociety.org/vol15/iss4/art38/

Cramer, K. L., O'Dea, A., Clark, T. R., Zhao, J., & Norris, R. D. (2017). Prehistorical and historical declines in Caribbean coral reef accretion rates driven by loss of parrotfish. *Nature Communications*, *8*, 14160. http://doi.org/10.1038/ncomms14160

Creswell, J. W. (2007). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches* (2nd ed.). Thousand Oaks: Sage Publications.

Cudney-Bueno, R., & Basurto, X. (2009). Lack of cross-scale linkages reduces robustness of community-based fisheries management. *PLoS ONE, 4*(7). http://doi.org/10.1371/journal.pone.0006253

D'Anna, L. M., & Murray, G. D. (2015). Perceptions of shellfish aquaculture in British Columbia and implications for well-being in marine social-ecological systems. *Ecology and*

*Society*, *20*(1). http://doi.org/10.5751/ES-07319-200157

Dalton, T., Forrester, G. E., & Pollnac, R. B. (2010). Formal co-management arrangements and MPA success in the Wider Caribbean. In *Proceedings of the 63rd Gulf and Caribbean Fisheries Institute*. San Juan, Puerto Rico.

Dalton, T., Forrester, G. E., & Pollnac, R. B. (2012). Participation, process quality, and performance of marine protected areas in the wider Caribbean. *Environmental Management*, *49*(6), 1224–1237. http://doi.org/10.1007/s00267-012-9855-0

Dalton, T., Forrester, G. E., & Pollnac, R. B. (2015). Are Caribbean MPAs making progress toward their goals and objectives? *Marine Policy*, *54*, 69–76. Retrieved from http://www.sciencedirect.com/science/article/pii/S0308597X14003467

Daniel, T. C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J. W., Chan, K. M. A., … von der Dunk, A. (2012). Contributions of cultural services to the ecosystem services agenda. *Proceedings of the National Academy of Sciences*, *109*(23), 8812–9. http://doi.org/10.1073/pnas.1114773109

Daniel, T. C., Muhar, A., Aznar, O., Boyd, J. W., Chan, K. M. A., Costanza, R., … Spierenburg, M. (2012). Reply to Kirchhoff: Cultural values and ecosystem services. *Proceedings of the National Academy of Sciences*, *109*(46), 3147. http://doi.org/10.1073/pnas.1213520109

Dasgupta, P. (1993). *An Inquiry into Well-Being and Destitution*. Oxford: Clarendon Press.

Daw, T. M., Brown, K., Rosendo, S., & Pomeroy, R. S. (2011). Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being. *Environmental Conservation*, *38*(4), 370–379. http://doi.org/10.1017/S0376892911000506

Daw, T. M., Cinner, J. E., McClanahan, T. R., Brown, K., Stead, S. M., Graham, N. A. J., & Maina, J. (2012). To Fish or not to Fish: Factors at multiple scales affecting artisanal fishers' readiness to exit a declining fishery. *PLoS ONE*, *7*(2). http://doi.org/10.1371/journal.pone.0031460

Daw, T. M., Hicks, C. C., Brown, K., Chaigneau, T., Januchowski-Hartley, F. A., Cheung, W. W. L., … McClanahan, T. R. (2016). Elasticity in ecosystem services: Exploring the

variable relationship between ecosystems and human well-being. *Ecology and Society*, *21*(2). http://doi.org/10.5751/ES-08173-210211

de Groot, R. S., Wilson, M. A., & Boumans, R. M. J. (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. *Ecological Economics*, *41*(3), 393–408. http://doi.org/10.1016/S0921-8009(02)00089-7

de Haan, L., & Zoomers, A. (2005). Exploring the Frontier of Livelihoods Research. *Development and Change*, *36*(1), 27–47. http://doi.org/10.1111/j.0012-155X.2005.00401.x

Dear, M. (1992). Understanding and overcoming the NIMBY syndrome. *Journal of the American Plannign Association*, *58*, 288–300.

Demissew, S., Carabias, J., Dı, S., Joly, C., Lonsdale, M., Ash, N., … Thomas, S. (2015). The IPBES Conceptual Framework — connecting nature and people. *Current Opinion in Environmental Sustainability*, *14*, 1–16. http://doi.org/10.1016/j.cosust.2014.11.002

Dempsey, J., & Robertson, M. M. (2012). Ecosystem services: Tensions, impurities, and points of engagement within neoliberalism. *Progress in Human Geography*, *36*(6), 758–779. http://doi.org/10.1177/0309132512437076

Deneulin, S., & McGregor, J. A. (2010). *The capability approach and the politics of a social conception of wellbeing* (No. 09/43). Bath. Retrieved from http://dx.doi.org/10.1177/1368431010382762

Desalination is the answer. (2012, July 25). *Jamaica Observer*. Kingston, Jamaica. Retrieved from http://www.jamaicaobserver.com/letters/Desalination-is-the-answer

Desalination plant not a viable option. (2014, July 22). *RJR Gleaner News*. Kingston, Jamaica.

di Cicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, *40*(4), 314–321. http://doi.org/10.1111/j.1365-2929.2006.02418.x

Dolan, A. H., & Walker, I. J. (2006). Understanding Vulnerability of Coastal Communities to Climate Change Related Risks. *Journal of Coastal Research*, *3*(39), 1316–1323.

DPP urges J'cans to rise above "informer fi dead" culture. (2014, September 20). *The Gleaner*.

Kingston, Jamaica. Retrieved from http://www.jamaicaobserver.com/news/DPP--Jamaica-must-rise-above--informer-fi-dead--culture_17572832

Dudley, N. (Ed.). (2008). *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: International Union for the Conservation of Nature (IUCN) Publications Services. Retrieved from https://books.google.co.uk/books?id=pq4oEg58_08C

Ebener, S., Khan, A. S., Shademani, R., Compernolle, L., Beltran, M., Lansang, M. A., & Lippmana, M. (2006). Knowledge mapping as a technique to support knowledge translation. *Bulletin of the World Health Organization*, *84*(8), 636–642. http://doi.org/10.2471/BLT.06.029736

England, R. W. (1998). Measurement of social well-being: alternatives to gross domestic product. *Ecological Economics*, *25*(1), 89–103. http://doi.org/10.1016/S0921-8009(97)00098-0

EWG. (2009). *Jamaica's National Ecological Gap Assessment Report (NEGAR)*. Kingston, Jamaica.

FAO. (n.d.). Caribbean queen conch (Strombus gigas). Retrieved April 21, 2016, from http://www.fao.org/docrep/006/y5261e/y5261e07.htm

FAO. (2014). *The State of World Fisheries and Aquaculture. Food and Agriculture Organization of the United Nations* (Vol. 2014). Rome. Retrieved from www.fao.org/3/a-i3720e.pdf

FAO. (2015a). Small-scale and artisanal fisheries. Retrieved February 24, 2015, from http://www.fao.org/fishery/topic/14753/en

FAO. (2015b). *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries*. Rome. Retrieved from http://www.fao.org/3/a-i4356e.pdf

Farley, J., & Costanza, R. (2010). Payments for ecosystem services: From local to global. *Ecological Economics*, *69*(11), 2060–2068. http://doi.org/10.1016/j.ecolecon.2010.06.010

Figueroa, M. (2005). Co-management and Valuation of Caribbean Coral Reefs: A Jamaican NGO Perspective. In M. Ahmed, C. K. Chong, & H. Cesar (Eds.), *Economic Valuation and*

*Policy Priorities for Sustainable Management of Coral Reefs* (Second, pp. 183–191). Penang, Malaysia: World Fish Center Conference Proceedings 70.

Fisher, B., Turner, R. K., & Morling, P. (2009). Defining and classifying ecosystem services for decision making. *Ecological Economics*, *68*(3), 643–653. http://doi.org/10.1016/j.ecolecon.2008.09.014

Flint, C. G., Kunze, I., Muhar, A., Yoshida, Y., & Penker, M. (2013). Exploring empirical typologies of human-nature relationships and linkages to the ecosystem services concept. *Landscape and Urban Planning*, *120*, 208–217. http://doi.org/10.1016/j.landurbplan.2013.09.002

Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive Governance of Social-Ecological Systems. *Annual Review of Environment and Resources*, *30*, 441–473. http://doi.org/10.1146/annurev.energy.30.050504.144511

Forcada, A., Valle, C., Bonhomme, P., Criquet, G., Cadiou, G., Lenfant, P., & José, L. S. L. (2009). Effects of habitat on spillover from marine protected areas to artisanal fisheries. *Marine Ecology Progress Series*, *379*, 197–211. http://doi.org/10.3354/meps07892

Fulton, L. (2013). *Drought conditions and management strategies in Jamaica* (Vol. Capacity D). Kingston, Jamaica. Retrieved from http://www.droughtmanagement.info/literature/UNW-DPC_NDMP_Country_Report_Jamaica_2013.pdf

Gibbert, M., & Ruigrok, W. (2010). The What'' and How'' of Case Study Rigor: Three Strategies Based on Published Work. *Organizational Research Methods*, *13*(4), 710–737. http://doi.org/10.1177/1094428109351319

Glaser, B. G. (2008). Conceptualization: On theory and theorizing using grounded theory. *International Journal of Qualitative Methods*, *1*(2), 23–38. http://doi.org/10.1103/Physics.3.106

GOC. (2013). *MPAs: Protecting high seas biodiversity* (No. 7). New York.

Gómez-Baggethun, E., de Groot, R. S., Lomas, P. L., & Montes, C. (2010). The history of ecosystem services in economic theory and practice: From early notions to markets and

payment schemes. *Ecological Economics*, *69*(6), 1209–1218.
http://doi.org/10.1016/j.ecolecon.2009.11.007

Gomm, R. (2009). *Key Concepts in Social Research Methods* (1st ed.). London: Palgrave
Macmillan.

Government of Jamaica. (1997). *Policy for the National System of Protected Areas*. Kingston,
Jamaica. Retrieved from //www.ambiente.gob.ec/sistema-nacional-de-areas-protegidas/

Guppy, N., & Gray, G. (2008). *Successful Surveys: Research Methods and Practice* (4th ed.).
Toronto: Thomson Nelson.

Hackbert, M. M. (1975). On assessing social well-being change. *The Annals of Regional Science*,
*9*(1), 56–67.

Hall, S. J., Dugan, P., Allison, E. H., & Andrew, N. L. (2010). The end of the line: Who is most
at risk from the crisis in global fisheries? *Ambio*, *39*(1), 78–80.
http://doi.org/10.1007/s13280-009-0008-5

Halpern, B. S. (2003). The impact of marine reserves: Do reserves work and does reserve size
matter. *Ecological Applications*, *13*(1), 117–137.

Halpern, B. S., Lester, S. E., & Kellner, J. B. (2010). Spillover from marine reserves and the
replenishment of fished stocks. *Environmental Conservation*, *36*(4), 268–276.
http://doi.org/10.1017/S0376892910000032

Halpern, B. S., & Warner, R. R. (2002). Marine reserves have rapid and lasting effects. *Ecology
Letters*, *5*, 361–366.

Hamann, M., Biggs, R., & Reyers, B. (2016). An exploration of human well-being bundles as
identifiers of ecosystem service use patterns. *PLoS ONE*, *11*(10).
http://doi.org/10.1371/journal.pone.0163476

Hargreaves-Allen, V., Mourato, S., & Milner-Gulland, E. J. (2011). A global evaluation of coral
reef management performance: Are MPAs producing conservation and socio-economic
improvements? *Environmental Management*, *47*(4), 684–700.

http://doi.org/10.1007/s00267-011-9616-5

Hernández-Morcillo, M., Plieninger, T., & Bieling, C. (2013). An empirical review of cultural ecosystem service indicators. *Ecological Indicators*, *29*, 434–444. http://doi.org/10.1016/j.ecolind.2013.01.013

Hicks, C. C. (2011). How Do We Value Our Reefs? Risks and Tradeoffs Across Scales in "Biomass-Based" Economies. *Coastal Management*, *39*, 358–376. http://doi.org/10.1080/08920753.2011.589219

Higman, B. W. (2008). *Jamaican Food: History Biology Culture*. Kingston, Jamaica: University of West Indies Press.

Honadle, G. (1999). *How Context Matters: Linking Environmental Policy to People and Place*. West Hartford: Kumarian Press.

Hoon, P., & Hyden, G. (2003). Governance and Sustainable Livelihoods. In H. T. A. Bressers & W. A. Rosenbaum (Eds.), *Achieving Sustainable Development: The Challenge of Governance Across Social Scales* (pp. 43–63). Westport: Praeger.

Hope, D. P. (2004). The British Link-up Crew - Consumption masquerading as masculinity in the Dancehall. *Interventions*, *6*(1), 101–117. http://doi.org/10.1080/1369801042000185688

Hossain, M. S., Dearing, J. A., Rahman, M. M., & Salehin, M. (2015). Recent changes in ecosystem services and human well-being in the Bangladesh coastal zone. *Regional Environmental Change*. http://doi.org/10.1007/s10113-014-0748-z

Hughes, T. P. (1994). Catastrophes, Phase Shifts, and Large-Scale Degradation of a Caribbean Coral Reefs. *Science*, *265*(5178), 1547–1551.

Hughes, T. P., Baird, A. H., Bellwood, D. R., Card, M., Connolly, S. R., Folke, C., … Roughgarden, J. (2003). Climate change, human impacts, and the resilience of coral reefs. *Science (New York, N.Y.)*, *301*(5635), 929–33. Retrieved from http://www.sciencemag.org/content/301/5635/929.short

Hughes, T. P., Reed, D. C., & Boyle, M. J. (1987). Herbivory on coral reefs: community

structure followong mass mortalities of sea urchins. *Journal of Experimental Marine Biology and Ecology*, *113*(1), 39–59. Retrieved from http://www.sciencedirect.com/science/article/B6T8F-488869T-135/2/1912037471df6b30c69ca5abe2b67a1d

Huijbers, C. M., Nagelkerken, I., & Layman, C. A. (2015). Fish movement from nursery bays to coral reefs: a matter of size? *Hydrobiologia*, *750*(1), 89–101. http://doi.org/10.1007/s10750-014-2162-4

ICLARM & IFM. (1996). *Analysis of Fisheries Co-Management Arrangements: A Research Framework*. Penang, Malaysia. Retrieved from http://www.ifm.dk/reports/21.PDF

ICRI. (2012). Parrotfish key to reef survival. Retrieved February 6, 2017, from http://www.icriforum.org/caribbeanreport

IICA. (2011). *Inside IICA Jamaica Q3 2011*. Kingston, Jamaica.

INSTASAVE. (2015). MSMEs: Building Climate Resilience - Climate Change, Coastal Community Enterprises, Adaptation, Resilience and Knowledge (CCCCE-ARK). Retrieved September 7, 2015, from http://www.intasave.org/Our-Projects_CCCCE--ARK.html

IUCN. (2015a). IUCN - Marine Protected Areas. Retrieved February 13, 2015, from http://iucn.org/about/work/programmes/marine/marine_our_work/marine_mpas/

IUCN. (2015b). Panulirus argus (Caribbean Spiny Lobster). Retrieved April 21, 2016, from http://www.iucnredlist.org/details/169976/0

Jackson, J. B. C. (2001). Historical Overfishing and the Recent Collapse of Coastal Ecosystems. *Science*, *293*(5530), 629–637. http://doi.org/10.1126/science.1059199

Jackson, J. B. C. (2014). From despair to repair: Protecting parrotfish can help bring back Caribbean coral reefs. Retrieved February 7, 2017, from http://ocean.si.edu/blog/despair-repair-protecting-parrotfish-can-help-bring-back-caribbean-coral-reefs

Jackson, J. B. C., Donovan, M. K., Cramer, K. L., & Lam, V. V. (2014). *Status and Trends of Caribbean Coral Reefs: 1970-2012*.

Jackson, K. M., & Trochim, W. M. K. (2002). Concept Mapping as an Alternative Approach for the Analysis of Open-Ended Survey Responses. *Organizational Research Methods*, *5*(4), 307–336. http://doi.org/10.1177/109442802237114

Jaffe, R. (2015). From Maroons to dons: Sovereignty, violence and law in Jamaica. *Critique of Anthropology*, *35*(1), 47–63. http://doi.org/10.1177/0308275X14557093

Jäger, J., Tàbara, J. D., & Chabay, I. (2013). Coupling human information and knowledge systems with social-ecological systems change - Reframing research, education, and policy for sustainability. *Environmental Science & Policy*, *28*, 71–81. http://doi.org/10.1016/j.envsci.2012.11.005

Jamaica Tourist Board. (2015). *Annual Travel Statistics 2015*. Kingston, Jamaica.

Jameson, S. C., Tupper, M. H., & Ridley, J. M. (2002). The three screen doors: Can marine "protected" areas be effective? *Marine Pollution Bulletin*, *44*(11), 1177–1183. http://doi.org/10.1016/S0025-326X(02)00258-8

Jason, L. A., Keys, C. B., Suarez-Balcazar, Y., Taylor, R. R., & Davis, M. I. (Eds.). (2004). *Participatory Community Research: Theories and Methods in Action*. Washington D.C.: American Psychological Association.

Jentoft, S. (2004). Institutions in fisheries: What they are, what they do, and how they change. *Marine Policy*, *28*, 137–149. http://doi.org/10.1016/S0308-597X(03)00085-X

Jentoft, S. (2005). Fisheries co-management as empowerment. *Marine Policy*, *29*(1), 1–7. http://doi.org/10.1016/j.marpol.2004.01.003

Jentoft, S., & Chuenpagdee, R. (2009). Fisheries and coastal governance as a wicked problem. *Marine Policy*, *33*, 553–560. http://doi.org/10.1016/j.marpol.2008.12.002

Jentoft, S., McCay, B. J., & Wilson, D. C. (1998). Social theory and fisheries co-management. *Marine Policy*.

Johnson, A. E. (2014a). To save coral reefs, start with parrotfish. Retrieved February 7, 2017, from http://voices.nationalgeographic.com/2014/07/02/to-save-coral-reefs-start-with-

parrotfish/

Johnson, A. E., Cinner, J. E., Hardt, M. J., Jacquet, J., McClanahan, T. R., & Sanchirico, J. N. (2013). Trends, current understanding and future research priorities for artisanal coral reef fisheries research. *Fish and Fisheries*, *14*(3), 281–292. http://doi.org/10.1111/j.1467-2979.2012.00468.x

Johnson, D. S. (2006). Category, narrative, and value in the governance of small-scale fisheries. *Marine Policy*, *30*(6), 747–756. http://doi.org/10.1016/j.marpol.2006.01.002

Johnson, N. H. (2014b). JAMAICA: A famous, strong but damaged brand. *Place Branding and Public Diplomacy*, *10*(3), 199–217. http://doi.org/10.1057/pb.2014.15

Jones, P. J. S., de Santo, E. M., Qiu, W., & Vestergaard, O. (2013). Introduction: An empirical framework for deconstructing the realities of governing marine protected areas. *Marine Policy*, *41*, 1–4. http://doi.org/10.1016/j.marpol.2012.12.025

JPS commissions desalination plant. (2016, June 9). *The Gleaner*. Kingston, Jamaica.

JPS looks to the sea. (2016, June 12). *Jamaica Observer*. Kingston, Jamaica.

Kaplan, K. A., Ahmadia, G. N., Fox, H. E., Glew, L., Pomeranz, E. F., & Sullivan, P. (2015). Linking ecological condition to enforcement of marine protected area regulations in the greater Caribbean region. *Marine Policy*, *62*, 186–195. http://doi.org/10.1016/j.marpol.2015.09.018

Katikiro, R. E. (2016). Improving alternative livelihood interventions in marine protected areas: A case study in Tanzania. *Marine Policy*, *70*, 22–29. http://doi.org/10.1016/j.marpol.2016.04.025

Kearney, J. F., Berkes, F., Pinkerton, E. W., & Wiber, M. (2007). The Role of Participatory Governance and Community-Based Management in Integrated Coastal and Ocean Management in Canada. *Coastal Management*, *35*, 79–104. http://doi.org/10.1080/10.1080/08920750600970511

Khakzad, S., & Griffith, D. (2016). The role of fishing material culture in communities' sense of

place as an added-value in management of coastal areas. *Journal of Marine and Island Cultures*, *5*(2), 95–117. http://doi.org/10.1016/j.imic.2016.09.002

Kittinger, J. N., Teneva, L. T., Koike, H., Stamoulis, K. A., Kittinger, D. S., Oleson, K. L. L., … Friedlander, A. M. (2015). From reef to table: Social and ecological factors affecting coral reef fisheries, artisanal seafood supply chains, and seafood security. *PLoS ONE*, *10*(8), 1–24. http://doi.org/10.1371/journal.pone.0123856

Klain, S. C., Satterfield, T. a., & Chan, K. M. A. (2014). What matters and why? Ecosystem services and their bundled qualities. *Ecological Economics*, *107*, 310–320. http://doi.org/10.1016/j.ecolecon.2014.09.003

Krippendorff, K. (2004). Reliability in content analysis: Some common misconceptions and recommendations. *Human Communication Research*, *30*(3), 411–433. http://doi.org/10.1111/j.1468-2958.2004.tb00738.x

Kristos, W. (2013). Bluefields Bay Fish Sanctuary: Now and Then. Trinidad.

Kronen, M. (2004). Fishing for fortunes? A socio-economic assessment of Tonga's artisanal fisheries. *Fisheries Research*, *70*(1), 121–134. http://doi.org/10.1016/j.fishres.2004.05.013

Krueger, A. B., & Stone, A. A. (2014). Progress in measuring subjective well-being. Moving toward national indicators and policy evaluations. *Science*, *346*(6205), 42–43.

Krueger, R. A. (1998). *Analyzing & Reporting Focus Group Results*. Thousand Oaks: Sage Publications Inc.

Laccino, L. (2014, July 2). Caribbean coral reefs to "disappear due to loss of parrofish and sea urchins." *International Business Times*. Manhattan. Retrieved from http://www.ibtimes.co.uk/caribbean-coral-reefs-disappear-due-loss-parrotfish-sea-urchins-1455056

Lee, S. (2014). Jamaican media highlights the topic of banning parrotfish. Retrieved February 6, 2017, from http://www.c-fish.org/jamaican-mainstream-media-highlights-the-topic-of-banning-parrotfish/

Leenhardt, P., Teneva, L. T., Kininmonth, S., Darling, E., Cooley, S., & Claudet, J. (2015). Challenges, insights and perspectives associated with using social-ecological science for marine conservation. *Ocean and Coastal Management*, *115*, 49–60. http://doi.org/10.1016/j.ocecoaman.2015.04.018

Lele, S., Springate-Baginski, O., Lakerveld, R., Deb, D., & Dash, P. (2013). Ecosystem Services: Origins, Contributions, Pitfalls, and Alternatives. *Conservation and Society*, *11*(4), 343–358. http://doi.org/10.4103/0972-4923.125752

Lemos, M. C., & Agrawal, A. (2006). Environmental Governance. *Annual Review of Environment and Resources*, *31*(1), 297–325. http://doi.org/10.1146/annurev.energy.31.042605.135621

Liquete, C., Piroddi, C., Drakou, E. G., Gurney, L., Katsanevakis, S., Charef, A., & Egoh, B. N. (2013). Current Status and Future Prospects for the Assessment of Marine and Coastal Ecosystem Services: A Systematic Review. *PLoS ONE*, *8*(7). http://doi.org/10.1371/journal.pone.0067737

Luisetti, T., Turner, R. K., Bateman, I. J., Morse-Jones, S., Adams, C., & Fonseca, L. (2011). Coastal and marine ecosystem services valuation for policy and management: Managed realignment case studies in England. *Ocean & Coastal Management*, *54*(3), 212–224. http://doi.org/10.1016/j.ocecoaman.2010.11.003

Luisetti, T., Turner, R. K., Jickells, T., Andrews, J., Elliott, M., Schaafsma, M., … Watts, W. (2014). Coastal Zone Ecosystem Services: from science to values and decision making; a case study. *Science of the Total Environment*, *493*, 682–93. http://doi.org/10.1016/j.scitotenv.2014.05.099

Lynch, A. J., Cooke, S. J., Deines, A. M., Bower, S. D., Bunnell, D. B., Cowx, I. G., … Beard, T. D. (2016). The social, economic, and environmental importance of inland fish and fisheries. *Environmental Review*, *121*(February), 115–121.

MA. (2005). *Ecosystems and Human Well-Being: Synthesis / Millennium Ecosystem Assessment*. (J. Sarukhan & A. Whyte, Eds.). Washington D.C.: Island Press. Retrieved from

http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Ecosystems+and+Human+Well-Being:+Synthesis#2

Macken-Walsh, Á. (2012). Operationalising contemporary rural development: Socio-cultural determinants arising from a strong local fishing culture. *Human Ecology*, *40*(2), 199–211. http://doi.org/10.1007/s10745-012-9477-4

Macleod, D. (2002). Disappearing culture? Globalisation and a Canary Island fishing community. *History and Anthropology*, *13*(1), 53–67. http://doi.org/10.1080/02757200290002888

Marshall, C., & Rossman, G. B. (1995). Data Collection Methods. In *Designing Qualitative Research* (2nd ed., pp. 78–107). Thousand Oaks: Sage.

Martín-López, B., Gomez-Baggethun, E., Lomas, P. L., & Montes, C. (2009). Effects of spatial and temporal scales on cultural services valuation. *Journal of Environmental Management*, *90*(2), 1050–1059. http://doi.org/10.1016/j.jenvman.2008.03.013

Masud, M. M., & Kari, F. B. (2015). Community attitudes towards environmental conservation behaviour: An empirical investigation within MPAs, Malaysia. *Marine Policy*, *52*, 138–144. http://doi.org/10.1016/j.marpol.2014.10.015

McClanahan, T. R., Allison, E. H., & Cinner, J. E. (2015). Managing fisheries for human and food security. *Fish and Fisheries*, *16*(1), 78–103. http://doi.org/10.1111/faf.12045

McClanahan, T. R., & Mangi, S. (2000). Spillover of exploitable fishes from a marine park and its effect on the adjacent fishery. *Ecological Applications*, *10*(6), 1792–1805. http://doi.org/10.1890/1051-0761(2000)010[1792:SOEFFA]2.0.CO;2

McGregor, J. A. (2008). *Well-being, Poverty and Conflict* (No. 1/08). *ESRC Research Group on Wellbeing in Developing Countries*. Bath.

McKenzie-Mohr, D. (n.d.). *Community-Based Social Marketing*. Fredericton.

Mertz, O., Ravnborg, H. M., Lövei, G. L., Nielsen, I., & Konijnendijk, C. C. (2007). Ecosystem services and biodiversity in developing countries. *Biodiversity and Conservation*, *16*(10),

2729–2737. http://doi.org/10.1007/s10531-007-9216-0

Milcu, A. I., Hanspach, J., Abson, D. J., & Fischer, J. (2013). Cultural ecosystem services: A literature review and prospects for future research. *Ecology and Society*, *18*(3). http://doi.org/10.5751/ES-05790-180344

Ministry of Justice Jamaica. The Beach Control Act (1991). Jamaica.

MLSS Public Relations Unit. (2016). Minimum Wage Rates Effective March 1 - Jamaica Information Service. Retrieved February 26, 2017, from http://jis.gov.jm/minimum-wage-rates-effective-march-1/

MOAF. (2011). Special Fishery Conservation Areas (SFCA). Retrieved July 11, 2015, from http://www.moa.gov.jm/Fisheries/fish_sanctuary.php

Moloney, K., & Chu, H.-Y. (2014). Linking Jamaica's Public Service Motivations and Ethical Climate. *The American Review of Public Administration*, 446–701. http://doi.org/10.1177/0275074014557022

Morgan, K. M., & Kench, P. S. (2016). Parrotfish erosion underpins reef growth, sand talus development and island building in the Maldives. *Sedimentary Geology*, *341*, 50–57. http://doi.org/10.1016/j.sedgeo.2016.05.011

Morse, J. M. (1991). Subjectives, respondents, informations, and participants? *Qualitative Health Research*, *1*(4), 403–406.

Mumby, P. J. (2006). Connectivity of reef fish between mangroves and coral reefs: Algorithms for the design of marine reserves at seascape scales. *Biological Conservation*, *128*(2), 215–222. http://doi.org/10.1016/j.biocon.2005.09.042

Mumby, P. J., Hastings, A., & Edwards, H. J. (2007). Thresholds and the resilience of Caribbean coral reefs. *Nature*, *450*(November), 98–101. http://doi.org/10.1038/nature06252

Nagelkerken, I., Bothwell, J., Nemeth, R. S., Pitt, J. M., & Van Der Velde, G. (2008). Interlinkage between Caribbean coral reefs and seagrass beds through feeding migrations by grunts (Haemulidae) depends on habitat accessibility. *Marine Ecology Progress Series*, *368*,

155–164. http://doi.org/10.3354/meps07528

Nagelkerken, I., Dorenbosch, M., Verberk, W. C. E. P., Cocheret De La Morinière, E., & Van Der Velde, G. (2000). Day-night shifts of fishes between shallow-water biotopes of a Caribbean bay, with emphasis on the nocturnal feeding of Haemulidae and Lutjanidae. *Marine Ecology Progress Series*, *194*, 55–64. http://doi.org/10.3354/meps194055

NASA. (2005). What's the Difference Between Weather and Climate? Retrieved February 15, 2017, from https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html

Nayak, P. K., Oliveira, L. E., & Berkes, F. (2014). Resource degradation, marginalization, and poverty in small-scale fisheries: Threats to social-ecological resilience in India and Brazil. *Ecology and Society*, *19*(2), 73.

NEF. (2012). *The Happy Planet Index: 2012 Report - A global index of sustainable well-being*.

NEPA. (n.d.). *Development of a Protected Areas Database for Jamaica*. Kingston, Jamaica.

NEPA. (2004). *Categorization of Protected Areas in Jamaica* (No. 1).

NES. (1991). *Partipatory Rural Appraisal Handbook: Conducting PRAs in Kenya*. (National Environment Secretariat (NES), Egerton University, Clark University, & Center for International Development and Environment of World Resources Institute, Eds.). National Environment Secretariat.

New Marine Sanctuary. (2015, June 3). *Western Mirror*. Montego Bay. Retrieved from http://www.sandalsfoundation.org/news/new-marine-sanctuary.html

Nicholson, E., Mace, G. M., Armsworth, P. R., Atkinson, G. B. J., Buckle, S., Clements, T., … Milner-Gulland, E. J. (2009). Priority research areas for ecosystem services in a changing world. *Journal of Applied Ecology*, *46*(6), 1139–1144. http://doi.org/10.1111/j.1365-2664.2009.01716.x

NOAA. (2014). *Marine Reserves in the United States*. Washington D.C.

Novalbos, J., Nogueroles, P., Soriguer, M., & Piniella, F. (2008). Occupational health in the Andalusian Fisheries Sector. *Occupational Medicine*, *58*(2), 141–143.

http://doi.org/10.1093/occmed/kqm156

O'Farrell, S., Luckhurst, B. E., Box, S. J., & Mumby, P. J. (2016). Parrotfish sex ratios recover rapidly in Bermuda following a fishing ban. *Coral Reefs*, *35*(2), 421–425. http://doi.org/10.1007/s00338-015-1389-5

Oleson, K. L. L., Barnes-Mauthe, M., Brander, L. M., Oliver, T. A., Van Beek, I., Zafindrasilivonona, B., & Van Beukering, P. (2015). Cultural bequest values for ecosystem service flows among indigenous fishers: A discrete choice experiment validated with mixed methods. *Ecological Economics*, *114*, 104–116. http://doi.org/10.1016/j.ecolecon.2015.02.028

Ostrom, E. (1990a). <Ostrom 1990 Governing the Commons Ch2.pdf>. *Governing the Commons*.

Ostrom, E. (1990b). *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press. Retrieved from http://www.kuhlen.name/MATERIALIEN/eDok/governing_the_commons1.pdf

Ostrom, E., Janssen, M. A., & Anderies, J. M. (2007). Going beyond panaceas. *Proceedings of the National Academy of Sciences*, *104*(39), 15176–8. http://doi.org/10.1073/pnas.0701886104

PAC. (2012a). *Protected Areas System Master Plan: Jamaica, Consultation Draft*. Kingston, Jamaica.

PAC. (2012b). *Protected Areas System Master Plan (PASMP): Jamaica 2013-2017*. Kingston, Jamaica. Retrieved from http://www.forestry.gov.jm/PDF_files/Public/Protected_Areas_System_Master_Plan_Consultation_Draft.pdf

Pandolfi, J. M., Bradbury, R. H., Sala, E., Hughes, T. P., Bjorndal, K. a, Cooke, R. G., … Jackson, J. B. C. (2003). Global trajectories of the long-term decline of coral reef ecosystems. *Science (New York, N.Y.)*, *301*(5635), 955–958. http://doi.org/10.1126/science.1085706

Pendleton, L. H., Thébaud, O., Mongruel, R. C., & Levrel, H. (2016). Has the value of global marine and coastal ecosystem services changed? *Marine Policy*, *64*, 156–158. http://doi.org/10.1016/j.marpol.2015.11.018

Percin, F., Akyol, O., Davas, A., & Saygi, H. (2012). Occupational health of Turkish Aegean small-scale fishermen. *Occupational Medicine*, *62*(2), 148–151. http://doi.org/10.1093/occmed/kqr181

Pinkerton, E. W. (1989). *Co-operative Management of Local Fisheries*. Vancouver, Canada: UBC Press.

Pittman, S. J., Monaco, M. E., Friedlander, A. M., Legare, B., Nemeth, R. S., Kendall, M. S., … Caldow, C. (2014). Fish with chips: Tracking reef fish movements to evaluate size and connectivity of Caribbean marine protected areas. *PLoS ONE*, *9*(5). http://doi.org/10.1371/journal.pone.0096028

Planning Institute of Jamaica. (2012). National Goals. In *Vision 2030 Jamaica: National Development Plan* (pp. 17–34). Kingston, Jamaica: Planning Institute of Jamaica.

Plummer, R., & Armitage, D. R. (2007). Crossing Boundaries, Crossing Scales: The Evolution of Environment and Resource Co-Management. *Geography Compass*, *1*(4), 834–849. http://doi.org/10.1111/j.1749-8198.2007.00040.x

Poe, M. R., Norman, K. C., & Levin, P. S. (2014). Cultural dimensions of socioecological systems: Key connections and guiding principles for conservation in coastal environments. *Conservation Letters*, *7*(3), 166–175. http://doi.org/10.1111/conl.12068

Polasky, S., & Segerson, K. (2009). Integrating Ecology and Economics in the Study of Ecosystem Services: Some Lessons Learned. *Annual Review of Resource Economics*, *1*, 409–434. http://doi.org/10.1146/annurev.resource.050708.144110

Pollnac, R. B., Crawford, B. R., & Gorospe, M. L. G. (2001). Discovering factors that influence the success of community- based marine protected areas in the Visayas, Philippines. *Ocean & Coastal Management*, *44*(11–12), 683–710.

Pomeroy, R. S., Katon, B. M., & Harkes, I. (2001). Conditions affecting the success of fisheries

co-management: Lessons from Asia. *Marine Policy*, *25*(3), 197–208.
http://doi.org/10.1016/S0308-597X(01)00010-0

Pomeroy, R. S., McConney, P., & Mahon, R. (2004). Comparative analysis of coastal resource
co-management in the Caribbean. *Ocean and Coastal Management*, *47*(9–10), 429–447.
http://doi.org/10.1016/j.ocecoaman.2004.09.005

Pomeroy, R. S., Parks, J. E., Pollnac, R. B., Campson, T., Genio, E., Marlessy, C., … Thu Hue,
N. (2007). Fish wars: Conflict and collaboration in fisheries management in Southeast Asia.
*Marine Policy*, *31*(6), 645–656. http://doi.org/10.1016/j.marpol.2007.03.012

Porter, J. R. (2012). A Simplified Indicator of Social Well-Being in the United States: Examining
the Ecological Impact of Family Formation within a County Level Framework. *Social
Indicators Research*, *108*(3), 421–440. http://doi.org/10.1007/s11205-011-9884-8

Potts, T., Burdon, D., Jackson, E. L., Atkins, J., Saunders, J., Hastings, E., & Langmead, O.
(2014). Do marine protected areas deliver flows of ecosystem services to support human
welfare? *Marine Policy*, *44*, 139–148. http://doi.org/10.1016/j.marpol.2013.08.011

Raudsepp-Hearne, C., Peterson, G. D., & Bennett, E. M. (2010). Ecosystem service bundles for
analyzing tradeoffs in diverse landscapes. *Proceedings of the National Academy of Sciences
of the United States of America*, *107*(11), 5242–7. Retrieved from
http://apps.isiknowledge.com/full_record.do?product=WOS&search_mode=AdvancedSearc
h&qid=1&SID=U1ADlMa62oB3pn11jce&page=1&doc=34

Reed, M. G., & Peters, E. J. (2004). Using an Ecological Metaphor to Build Adaptive and
Resilient Research Practices. *ACME: An International E-Journal for Critical Geographies*.

Rees, S. E., Rodwell, L. D., Searle, S., & Bell, A. (2013). Identifying the issues and options for
managing the social impacts of Marine Protected Areas on a small fishing community.
*Fisheries Research*, *146*, 51–58. http://doi.org/10.1016/j.fishres.2013.04.003

Reithe, S. (2014). Marine protected areas in a welfare-based perspective. *Marine Policy*, *49*, 29–
36. http://doi.org/10.1016/j.marpol.2014.04.002

Renard, D., Rhemtulla, J. M., & Bennett, E. M. (2015). Historical dynamics in ecosystem service

bundles. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(43), 13411–13416. http://doi.org/10.1073/pnas.1502565112

Ribot, J. C., & Peluso, N. L. (2009). A Theory of Access. *Rural Sociology*, *68*(2), 153–181. http://doi.org/10.1111/j.1549-0831.2003.tb00133.x

Richards, L. (2005). Coding. In *Handling Qualitative Data: A Practical Guide*. Thousand Oaks: Sage Publications Inc.

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*, *4*(December 1969), 155–169.

Rocha, J., Yletyinen, J., Biggs, R., Blenckner, T., & Peterson, G. D. (2015). Marine regime shifts: drivers and impacts on ecosystems services. *Philosophical Transactions of the Royal Society B*, *370*(1659), 20130273.

Rockström, J. (2009). A safe operating space for humanity. *Nature*, *461*(September), 472–475.

Rossiter, J. S., & Levine, A. S. (2014). What makes a "successful" marine protected area? The unique context of Hawaiʹs fish replenishment areas. *Marine Policy*, *44*, 196–203. http://doi.org/10.1016/j.marpol.2013.08.022

Rudolph, J. H. (2012). Effects of Artificial Reef Implementation on Fish Populations in a marine Protected Area: Bluefields Bay, Jamaica, (December), 176.

Sadovy, Y. J. (2005). Trouble on the reef: The imperative for managing vulnerable and valuable fisheries. *Fish and Fisheries*, *6*(3), 167–185. http://doi.org/10.1111/j.1467-2979.2005.00186.x

Salant, P., & Dillman, D. A. (1994). Cornerstones of a Quality Survey. In *How to Conduct Your Own Survey* (pp. 13–24). Toronto: Wiley.

Sarracino, F. (2010). Social capital and subjective well-being trends: Comparing 11 western European countries. *Journal of Socio-Economics*, *39*(4), 482–517. http://doi.org/10.1016/j.socec.2009.10.010

Save the parrotfish! (2016, July 6). *Jamaica Observer*. Kingston, Jamaica. Retrieved from

http://www.jamaicaobserver.com/environment/Save-the-parrotfish-_66229

Schorr, D. K. (2005). *Artisanal Fishing: Promoting Poverty Reduction and Community Development Through New WTO Rules on Fisheries Subsidies*. Geneva.

Schröter, M., van der Zanden, E. H., van Oudenhoven, A. P. E., Remme, R. P., Serna-Chavez, H. M., de Groot, R. S., & Opdam, P. (2014). Ecosystem Services as a Contested Concept: A Synthesis of Critique and Counter-Arguments. *Conservation Letters*, *7*(6), 514–523. http://doi.org/10.1111/conl.12091

Scoones, I. (2009). Livelihoods perspectives and rural development. *Journal of Peasant Studies*, *36*(1), 171–196. http://doi.org/10.1080/03066150902820503

Selig, E. R., & Bruno, J. F. (2010). A global analysis of the effectiveness of marine protected areas in preventing coral loss. *PLoS ONE*, *5*(2), 1–7. http://doi.org/10.1371/journal.pone.0009278

Sievanen, L., Crawford, B., Pollnac, R. B., & Lowe, C. (2005). Weeding through assumptions of livelihood approaches in ICM: Seaweed farming in the Philippines and Indonesia. *Ocean and Coastal Management*, *48*(3–6 SPEC. ISS.), 297–313. http://doi.org/10.1016/j.ocecoaman.2005.04.015

Sinclair-Maragh, G., & Gursoy, D. (2015). Imperialism and tourism: The case of developing island countries. *Annals of Tourism Research*, *50*, 143–158. http://doi.org/10.1016/j.annals.2014.12.001

Slater, M. J., Napigkit, F. A., & Stead, S. M. (2013). Resource perception, livelihood choices and fishery exit in a Coastal Resource Management area. *Ocean and Coastal Management*, *71*, 326–333. http://doi.org/10.1016/j.ocecoaman.2012.11.003

Smith, L. M., Case, J. L., Smith, H. M., Harwell, L. C., & Summers, J. K. (2013). Relating ecoystem services to domains of human well-being: Foundation for a U.S. index. *Ecological Indicators*, *28*, 79–90. http://doi.org/10.1016/j.ecolind.2012.02.032

Spalding, M. D., Meliane, I., J. Bennett, N., Dearden, P., G. Patil, P., & D. Brumbaugh, R. (2016). Building towards the marine conservation end-game: consolidating the role of

MPAs in a future ocean. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *26*(September), 185–199. http://doi.org/10.1002/aqc.2686

Stanley, S. M., Markman, H. J., & Whitton, S. W. (2002). Communication, conflict, and commitment: Insights on the foundations of relationship success from a national survey. *Family Process*, *41*(4), 659–675. http://doi.org/10.1111/j.1545-5300.2002.00659.x

Stobart, B., Warwick, R., Gonzalez, C., Mallol, S., Diaz, D., Renones, O., & Goni, R. (2009). Long-term and spillover effects of a marine protected area on an exploited fish community. *Marine Ecology Progress Series*, *384*, 47–60. http://doi.org/10.3354/meps08007

Strauss, A., & Corbin, J. (1998). *Basics of Qualitative Research* (2nd ed.). Thousand Oaks: Sage.

Sun, L., Yung, E. H. K., Chan, E. H. W., & Zhu, D. (2016). Issues of NIMBY conflict management from the perspective of stakeholders: A case study in Shanghai. *Habitat International*, *53*, 133–141. http://doi.org/10.1016/j.habitatint.2015.11.013

Sun, L., Zhu, D., & Chan, E. H. W. (2016). Public participation impact on environment NIMBY conflict and environmental conflict management: Comparative analysis in Shanghai and Hong Kong. *Land Use Policy*, *58*, 208–217. http://doi.org/10.1016/j.landusepol.2016.07.025

Sutherland, R. (2014, February 16). A weak government cannot fight crime. *Jamaica Observer*. Kingston, Jamaica. Retrieved from http://www.jamaicaobserver.com/columns/A-weak-government-cannot-fight-crime_16065425

Taylor, B. N., & Kuyatt, C. E. (1994). *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*. Gaithersburg, USA.

TEEB. (2009). *TEEB - The Economics of Ecosystems and Biodiversity for National and international Policy Makers*. Nairobi.

Tengberg, A., Fredholm, S., Eliasson, I., Knez, I., Saltzman, K., & Wetterberg, O. (2012). Cultural ecosystem services provided by landscapes: Assessment of heritage values and identity. *Ecosystem Services*, *null*(null). Retrieved from http://dx.doi.org/10.1016/j.ecoser.2012.07.006

Thame, C. (2016, February 19). Tourism climbs to new record, peak season off to good start. *The Gleaner*. Kingston, Jamaica. Retrieved from http://jamaica-gleaner.com/article/business/20160219/tourism-climbs-new-record-peak-season-good-start

The University of Texas At Austin. (2002). Jamaica (Political). Austin, Texas: University of Texas.

Thompson, K. (2014, July 9). Parrotfish ban? *Jamaica Observer*. Kingston, Jamaica. Retrieved from http://www.jamaicaobserver.com/news/Parrotfish-ban

Thorpe, A., Bavinck, M., & Coulthard, S. (2011). Tracking the debate around marine protected areas: Key issues and the BEG framework. *Environmental Management*, *47*(4), 546–563. http://doi.org/10.1007/s00267-011-9632-5

Time to rid country of "informer fi dead" culture - Mayor Harris. (2014, December 4). *Jamaica Observer*. Kingston. Retrieved from http://www.jamaicaobserver.com/news/Time-to-rid-country-of--informer-fi-dead--culture---Mayor-Harris_18054123

Trimble, M., & Johnson, D. S. (2013). Artisanal fishing as an undesirable way of life? The implications for governance of fishers' wellbeing aspirations in coastal Uruguay and southeastern Brazil. *Marine Policy*, *37*(1), 37–44. http://doi.org/10.1016/j.marpol.2012.04.002

Trussell, D. E. (2014). Dancing in the margins. *Journal of Leisure Research*, *46*(3), 342–352.

Turner, N., Gregory, R., & Brooks, C. (2008). From Invisibility to Transparency: Identifying the Implications. *Ecology and Society*, *13*(2), 7. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=17083087&AN=42407970&h=cV+BQZFid52ptp9OXn82KDa0RwlVtMoXkNGR4RKHETF69CM9fOiwiq5PygeSnOhDQ/+EMw1+3s9N0LYsb8YPcQ==&crl=c

U.S. Department of State. (2012). *Jamaica 2012 International Religious Freedom Report*. Washington D.C. Retrieved from http://www.state.gov/documents/organization/208688.pdf

Udolisa, R. E. K., Akinyemi, A. A., & Olaoye, O. J. (2013). Occupational and health hazards in Nigerian coastal artisanal fisheries. *Fisheries and Aquatic Science*, *8*(1), 14–20.

http://doi.org/10.1146/annurev.ecolsys.110308.120220

UN. (2015). Country Profile: Jamaica. Retrieved April 3, 2015, from
    http://data.un.org/CountryProfile.aspx?crName=jamaica

UNDP, & NEPA. (2011). *Strengthening the operational and financial sustainability of the
    national Protected Area System*. *UNDP Jamaica Project Document*. Copenhagen.

UNEP. (2015). *WDPA Data Status Report: Jamaica*. Nairobi, Kenya.

UNESCO. (2016). Tangible Cultural Heritage. Retrieved February 13, 2017, from
    http://www.unesco.org/new/en/cairo/culture/tangible-cultural-heritage/

Wamukota, A. W., Cinner, J. E., & McClanahan, T. R. (2012). Co-management of coral reef
    fisheries: A critical evaluation of the literature. *Marine Policy*, *36*(2), 481–488.
    http://doi.org/10.1016/j.marpol.2011.09.001

WCED. (1987). *Our Common Future*. *Our Common Future*. New York: Oxford University
    Press.

WECAFC. (2014). *Western Central Atlantic Fishery Commission Fifteenth Session Final
    Report*. Port of Spain.

Weeratunge, N., Béné, C., Siriwardane, R., Charles, A. T., Johnson, D. S., Allison, E. H., …
    Badjeck, M. C. (2014). Small-scale fisheries through the wellbeing lens. *Fish and Fisheries*,
    *15*(2), 255–279. http://doi.org/10.1111/faf.12016

Wells, S., Ray, G. C., Gjerde, K. M., White, A. T., Muthiga, N. A., Bezaury Creel, J. E., … Reti,
    J. (2016). Building the future of MPAs - lessons from history. *Aquatic Conservation:
    Marine and Freshwater Ecosystems*, *26*, 101–125. http://doi.org/10.1002/aqc.2680

White, P. C. L., Godbold, J. A., Solan, M., Wiegand, J., & Holt, A. R. (2010). Ecosystem
    Services and Policy: A Review of Coastal Wetland Ecosystem Services and an Efficiency-
    Based Framework for Implementing the Ecosystem Approach. *Issues in Environmental
    Science and Technology*, *30*, 29–51.

White, S. C. (2009a). *Analysing wellbeing: a framework for development practice* (No. 09–44).

Bath. Retrieved from http://dx.doi.org/10.1080/09614520903564199

White, S. C. (2009b). *Bringing Wellbeing into Development Practice* (No. 09–50). Bath. Retrieved from http://opus.bath.ac.uk/15944/

Why not desalination. (2015, July 29). *Jamaica Observer*. Kingston, Jamaica. Retrieved from http://www.jamaicaobserver.com/letters/Why-not-desalination-_19220452

Wieland, R., Ravensbergen, S., Gregr, E. J., Satterfield, T. a., & Chan, K. M. A. (2016). Debunking trickle-down ecosystem services: The fallacy of omnipotent, homogeneous beneficiaries, *121*, 175–180. http://doi.org/10.1016/j.ecolecon.2015.11.007

Wilkinson, C., & Salvat, B. (2012). Coastal resource degradation in the tropics: does the tragedy of the commons apply for coral reefs, mangrove forests and seagrass beds. *Marine Pollution Bulletin*, *64*(6), 1096–105. http://doi.org/10.1016/j.marpolbul.2012.01.041

Wills-Herrera, E., Orozco, L. E., Forero-Pineda, C., Pardo, O., & Andonova, V. (2011). The relationship between perceptions of insecurity, social capital and subjective well-being: Empirical evidences from areas of rural conflict in Colombia. *Journal of Socio-Economics*, *40*(1), 88–96. http://doi.org/10.1016/j.socec.2010.08.002

Wilson, C. M., & Matthews, W. H. (1970). *Man's impact on the global environment: Report of the study of critical environmental problems (SCEP)*. Cambridge, MA: MIT Press.

World Bank. (2016). International tourism, number of arrivals. Retrieved February 13, 2017, from http://data.worldbank.org/indicator/ST.INT.ARVL

WRI. (2009). Belize Takes Action to Protect the Value of Its Coral Reefs. Retrieved February 7, 2017, from https://www.wri.org/our-work/top-outcome/belize-takes-action-protect-value-its-coral-reefs

Wright, W. C. C., & Eppink, F. V. (2016). Drivers of heritage value: A meta-analysis of monetary valuation studies of cultural heritage. *Ecological Economics*, *130*, 277–284. http://doi.org/10.1016/j.ecolecon.2016.08.001

WWF. (2015). Island of Jamaica in the Caribbean. Retrieved April 4, 2015, from

https://www.worldwildlife.org/ecoregions/nt0131

Yandle, T. (2003). The challenge of building successful stakeholder organizations: New Zealand's experience in developing a fisheries co-management regime. *Marine Policy*, *27*(2), 179–192. http://doi.org/10.1016/S0308-597X(02)00071-4

Yin, R. K. (2009). *Case Study Research: Design and Methods*. *Applied Social Research Methods Series: Volume 5* (3rd ed.). Thousand Oaks: Sage. http://doi.org/10.1097/FCH.0b013e31822dda9e

Yin, R. K. (2011). Compiling, Disassembling, and Reassembling. In *Qualitative Research from Start to Finish* (First, pp. 176–204). New York: The Guilford Press.

Young, O. R., King, L. A., & Schroeder, H. (Eds.). (2008). *Institutions and Environmental Change*. Cambridge, Mass.: The MIT Press.

Zytoon, M. A. (2012). Occupational injuries and health problems in the Egyptian Mediterranean fisheries. *Safety Science*, *50*(1), 113–122. http://doi.org/10.1016/j.ssci.2011.07.010

## Appendix A

## Interview Guide

**Interview Script (approximate time: 30-60 minutes)**
Please remember that you may stop the interview at any time, and that you may choose not to answer any question that you do not feel comfortable answering. With your permission, I would like to record your answers on this recorder. Are you ready to begin?

**Question Set 1: General Questions**
- Please tell me a little bit about yourself.
  - For example, your childhood, where you grew up, and your family.
- Please tell me your age, and describe your role in your community
- What does the ocean mean to you?
- How important was the ocean for you when you were growing up?

**Question Set 2: Ecosystem Services, Social Wellbeing**
- Name up to two of the most important tangible, material benefits that you get from the ocean. These are benefits that you can touch.
- Name up to two of the most important non-tangible, non-material benefits that you receive from the ocean. These are benefits that you cannot touch.
  - *If asked to elaborate: Perhaps it is something that you experience through other senses, such as sight and hearing, or perhaps it is something that you experience as an emotion or relationship, such as feeling joy when you swim or sit on the beach.*
- Of the benefits that you have mentioned, which one is the most important to you, personally?
  - Why?
  - *If asked to elaborate: For example, is there a particular plant or animal that people consume, sell, or that people may use for other purposes such as a cultural celebration?*
- In your community, tell me about the single most important person to you…
  - On a personal level, for example, your friends, or your family; you do not need to name them if you do not feel comfortable.
  - On a professional and economic level; you do not need to name them if you do not feel comfortable.
  - Is there anyone else important to you who does not fit under these categories?
    - *If yes:* Describe one of these people, and why they are important to you. Again, keep in mind that you do not need to name this person.
- Think of someone that you consider as "successful":
  - What do they have?
  - What do they do?
  - What makes you consider them "successful"?

- What does a "good quality of life" mean to you?
- Is being a fisher/vendor giving you the quality of life that you want?
- At this moment in time, do you feel safe and secure?
  - *If asked to elaborate: For example, I mean safety and security regarding your economic situation, your relationships, the security of your home.*
- If you were told that you could no longer be a fisher/vendor, what are three emotions that you would feel? Elaborate on some of these feelings.

**Question Set 3: Changes after the MPA**
- In the past 10 years do you feel that your overall quality of life has changed?
  - *If yes:* How? Positively, or negatively, or a mix of both?
  - What is one reason behind this change?
- How has the fish sanctuary impacted your feeling of safety and security?
- How has the fish sanctuary impacted your identity?
  - *If asked to elaborate: Has the fish sanctuary changed the way that you see yourself, or the way that others in the community see you?*
- Name up to three benefits that you received from the ocean in the past that you no longer receive, now that the fish sanctuary is present.
  - *Prompt: Refer back to responses from question set 2. "For example, these are some of the benefits that you mentioned previously…"*
- Discuss how the fish sanctuary has impacted your material needs, for example…
  *For fishers*
  - Where and what do you fish now?
  - How have your absolute catch sizes changed?
  - Have the types of things that you fish or extract changed?
  - How have your total fishing efforts change? Do you feel that you are using more time or resources to meet your needs than you used to?

  *For vendors*
  - Have the fish and resources that you have been selling changed in number? In size? In value?
  - Do you feel that you are using more time or resources to meet your needs than you used to?
- How has the fish sanctuary impacted your relationship with the important people in your life?
  - *Prompt: Refer back to responses from question set 2. "For example, these are some of the people that you mentioned previously…"*
- In your opinion, how has the fish sanctuary impacted the community, as a whole?
- Do you feel that there are people you can trust to talk about some of the challenges you are facing from the fish sanctuary?
- What is one suggestion that you might have to improve a sanctuary so that it better supports communities?

# Appendix B

# Focus Group Guide

<u>**FOCUS GROUP PLAN**</u>

**PHASE 1: Ecosystem Services** (Brown et al., 2008 as cited in Daw et al., 2011)
1) Discuss and list how the sea (coastal ecosystem) is important to you and to your community.
2) How would you rank these benefits from most important to least important?

*Process: Prompt with existing data from interviews if needed. Write brainstormed ideas onto chart paper or large Bristol board. Identify the top five services (most valued by focus group members) and circle them. Transfer these top five services onto five post-it notes, move around post-its to rank. Take photos of progress after each phase.*
**Time: 10 minutes**

**PHASE 2: Social Wellbeing** (Abunge et al., 2013; Camfield et al., 2009)
3) Discuss and list the main aspects of life that are needed to live well in your community. What is "living a good life" and "having a good life"?
4) How would you rank these components of a "good life" from most important to least important?

*Process: Prompt with existing data from interviews if needed. Write brainstormed ideas onto chart paper or large Bristol board. Identify the top five components (most valued by focus group members) and circle them. Transfer these top five services onto five post-it notes, stick post-its onto previous board containing ES post-its, move around post-its to rank.*
**Time: 10 minutes**

**PHASE 3: Making Connections**
5) Discuss how the top three ecosystem services and top three components of social wellbeing related.

*Process: Review the top three selections from phase 1 and 2 by looking at post-its, and attempt to create a concept map with post-its to visualize connections.*
**Time: 15 minutes**
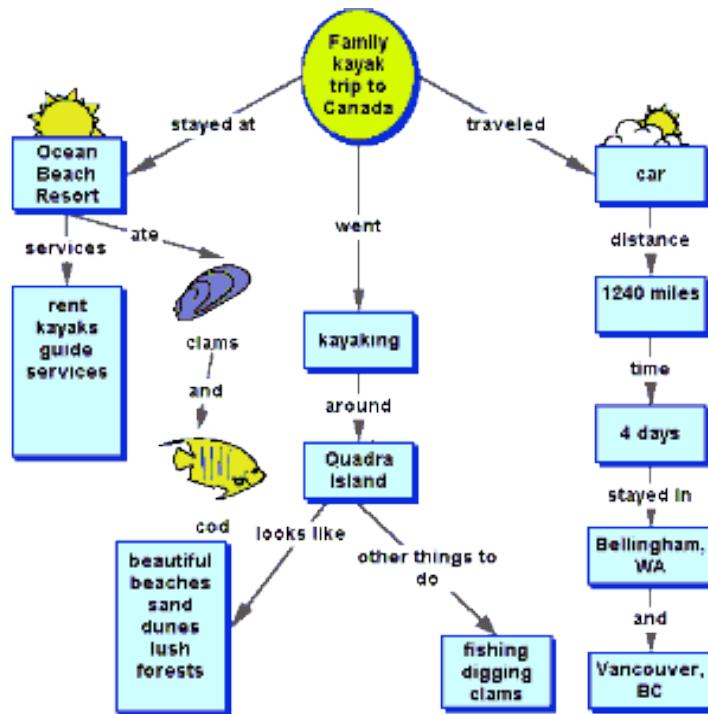
**Figure 1 Concept map example, where blue boxes could be post-its - identifying not only the linkages, but also HOW things are linked in specific detail. Source: http://www.worldofcity.tk/concept-map/**

## PHASE 4: Changes in Access

6) Discuss how the sanctuary has changed your access to benefits from the sea.
7) Discuss how these changes in access have affected your ability to live a good life.

*Process: Use the concept map and post-its from previous phases to spur discussion, examine where certain benefits have increased, decreased, or disappeared. Look at changes in connections between ES and wellbeing – possibly using a different coloured marker to note discussions from this phase on existing concept map.*

**Time: 15 minutes**

## PLANNED TOTAL TIME: 50 MINUTES

Table 1: Suggested focus groups and locations for focus groups.

| Focus Group (based on landing site) | Focus Group Location | Compensation |
|---|---|---|
| Bluefields (BBFFS office) | BPCA gazebo | Free meal |
| Belmont (Belmont Beach and Blacks Bay) | Prince's restaurant | Free meal |
| Paradise | Paradise | Phone credits/beer |

209

Table 2: Connections between phases, questions, and research objectives.

| Objectives | Relevant Phases and Questions |
|---|---|
| 1) Identify the ecosystem service bundles that are valued by different community groups. | **Phase 1:**<br>1) Discuss and list how the sea (coastal ecosystem) is important to you and to your community.<br>2) How would you rank these benefits from most important to least important?<br><br>*Insight regarding differences may arise between communities, and also from discussions within the focus groups between different fisher groups.* |
| 2) Define how a marine protected area (MPA) has changed access to these bundles for each group | **Phase 4:**<br>6) Discuss how the sanctuary has changed your access to benefits from the sea. |
| 3) Examine how changes in access to these bundles have affected material, subjective, and relational wellbeing. | **Phase 2:**<br>3) Discuss and list the main aspects of life that are needed to live well in your community. What is "living a good life" and "having a good life"?<br>4) How would you rank these components of a "good life" from most important to least important?<br><br>**Phase 4:**<br>7) Discuss how these changes in access have affected your ability to live a good life. |
| 4) Link ES and SW data to challenge conventional governance (e.g., siting, design, management) of MPAs and MPA networks. | **Phase 3:**<br>5) Discuss how the top three ecosystem services and top three components of social wellbeing related.<br><br>**Phase 4:**<br>6) Discuss how the sanctuary has changed your access to benefits from the sea.<br>7) Discuss how these changes in access have affected your ability to live a good life. |

# Appendix C

# Questionnaire

RA Initials: _____ Date: _____ No. _____

**Ecosystems Services and Social Wellbeing Survey**

<u>**PART 1: Demographics**</u>

1) Gender *(circle)*:   MALE   /   FEMALE

2) Age range:
      a) 18-25
      b) 26-35
      c) 36-45
      d) 46-55
      e) 56-65
      f) 66-75
      g) 76+

3) Home community:
      a) Auldayr
      b) Belmont
      c) Bluefields
      d) Cave
      e) Mearnsville
      f) Paradise
      g) Other: _____

4) Landing site(s) *(check all that apply)*:
      a) _____BBFFS/BPCA
      b) _____Bluefields Beach Park
      c) _____Black's Bay
      d) _____Cave Beach
      e) _____Mearnsville
      f) _____Paradise
      g) _____Other: _____

5) Member of BBFFS *(circle)*:   YES   /   NO

6) Fishing status:
      a) Active
      b) Retired, since year: _____

7) Years of fishing experience:
      a) <5
      b) 5-10
      c) 11-15
      d) 16-20
      e) 21-25
      f) 26-30
      g) 31-35
      h) 36-40
      i) 40+

8) Fishing method *(check all that apply)*:
   a) _____Spear/shoot
   b) _____Pot/trap
   c) _____Line
   d) _____Net
   e) _____Other, please specify: _____

9) Access to sea:
   a) No boat, swim out from shore
   b) OWN boat
      i. Type of boat(s) and number:

         _____Canoe

         _____Engine boat, less than 12 feet

         _____Engine boat, greater than 12 feet

   c) Other, please specify: _____

10) Dependence: Complete the following sentence.  In the past year, on average, fishing has made up _____ of my monthly income.
    a) 0-25%
    b) 26-50%
    c) 51-75%
    d) 75%-99%
    e) 100%

11) Alternative livelihoods: Apart from fishing, my other jobs in the past five years include/have included...*(check all that apply)*

    a) _____Art (e.g., painting, carving)

    b) _____Construction, please specify: _____.

    c) _____Farming.

    d) _____Tourism, please specify: _____.

    e) _____Other, please specify: _____.

    f) _____Not applicable.

## PART 2: Social Wellbeing

12) Partnerships: Choose the option that BEST completes the following sentence.  On an average day, I fish...
    a) Alone.
    b) With family.
    c) With friends.
    d) With business partners.

212

13) Wellbeing: Considering only FISHING as paying work (i.e., do not take into account other jobs or sources of income), on a scale of 1 to 3 (where 1=easy or moderately easy, 2=difficult, 3=very difficult), how well are you currently able to achieve or access the following components of a "good life"? (circle the appropriate number on each scale)

|  | Easy | Difficult | Very difficult |
|---|---|---|---|
| a) Advocacy (i.e., someone to stand up for you and your needs) | 1 | 2 | 3 |
| b) Education | 1 | 2 | 3 |
| c) Family and friends | 1 | 2 | 3 |
| d) Good physical health | 1 | 2 | 3 |
| e) Happiness | 1 | 2 | 3 |
| f) Home (food, shelter, water) | 1 | 2 | 3 |
| g) Independence | 1 | 2 | 3 |
| h) Love | 1 | 2 | 3 |
| i) Money | 1 | 2 | 3 |
| j) Religion | 1 | 2 | 3 |
| k) Stable and enjoyable work | 1 | 2 | 3 |

14) Values: Think about what being "successful in life" means to you, personally. From the list above in question 15, choose three components that you think best represent "success" in life. (circle the letters of the three components above)

15) Fulfillment: Has being a fisher allowed you to achieve the three components that you have chosen? (circle):  YES  /  NO

16) Self-determination: Choose the option that BEST completes the following sentence. I am a fisher because...
   a) I had no other choices.
   b) Fishing allows me to be independent.
   c) I love fishing.
   d) Members of my family and/or friends were involved in fishing.

   e) Other, please specify: _____.

17) <u>Social capital:</u> On an average day, what percentage of your fish do you give/sell to the following groups? *(Write the **percentage** in the blank for all that apply, total should equal 100%)*

    a) _____Vendors and markets (e.g., in Sav or in Whitehouse).

    b) _____Hotels and restaurants.

    c) _____Family and friends.

    d) _____Other customers that pre-order.

    e) _____Passersby on the road.

    f) _____Other, please specify: _____.

### PART 3: Ecosystem Services and Factors Affecting Wellbeing

18) <u>Fish availability versus access:</u> On a scale of one to five (where 1=large negative impact, 3=no impact, and 5=large positive impact), what impact do the following factors have on your personal ability to achieve a "good life"? *(Prompt: Refer back to components of a good life in question 15 and 16)*

| | | Large negative impact | Slight negative impact | No impact | Slight positive impact | Large positive impact |
|---|---|---|---|---|---|---|
| **Availability** | a) Invasive species (e.g., lion fish) | 1 | 2 | 3 | 4 | 5 |
| | b) Historic overfishing | 1 | 2 | 3 | 4 | 5 |
| | c) Current illegal fishing (e.g., dynamite) | 1 | 2 | 3 | 4 | 5 |
| | d) Pollution and environmental damage | 1 | 2 | 3 | 4 | 5 |
| | e) Artificial reef installation | 1 | 3 | 3 | 4 | 5 |
| | f) Climate change | 1 | 2 | 3 | 4 | 5 |
| | g) Natural disasters (e.g., hurricane) | 1 | 2 | 3 | 4 | 5 |
| **Access** | h) The sanctuary | 1 | 2 | 3 | 4 | 5 |
| | i) Tourism development and interest | 1 | 2 | 3 | 4 | 5 |
| | j) Other fishers from your community | 1 | 2 | 3 | 4 | 5 |
| | k) Other fishers outside of your community (e.g., from Sav) | 1 | 2 | 3 | 4 | 5 |
| | l) Government policies and regulation | 1 | 2 | 3 | 4 | 5 |
| | m) Gear restriction and quality, boat access | 1 | 2 | 3 | 4 | 5 |
| | n) Changes in cost of living (e.g., gas) | 1 | 2 | 3 | 4 | 5 |

214

19) Barriers: From ONLY THE LIST OF ITEMS scored with a 1 (or 2, if needed), choose the three greatest barriers that are stopping you from achieving a "good life". (circle the letters of the three barriers on the previous page in Q18)

## PART 4: The Sanctuary

20) Public participation:
    a) Were you consulted about the sanctuary before it was implemented? (circle):   YES   /   NO

                  IF YES, go to Q20b.

                  IF NO, go to Q21.

    b) Is the sanctuary what you expected based on what was explained to you at the time of the consultation? (circle):   YES   /   NO

                  IF YES, go to Q21

    IF NO, please specify the differences:_____.

21) Understanding: Based on your current understanding of the sanctuary, rank the following options from 1 to 4, where 1 represents the statement that you think BEST completes the following sentence: The sanctuary was created...(write the ranking in the blanks below)

    a) _____to protect the fish.

    b) _____for me, my family, and future generations.

    c) _____for the government.

    d) _____for reasons that I do not understand.

22) Management: Choose the option that BEST completes the following sentence.  I think that the sanctuary's day-to-day operations should be managed by...

    a) The government and the marine police.

    b) A private organization (e.g., Bluefields Bay Villas).

    c) The wardens of the sanctuary, as it currently is.

    d) Representatives elected by fishers and/or community members.

    e) A combination of the above, please specify: _____.

    f) Other, please specify: _____.

23) Governance: Rank the following options from 1-4 (or 1-5), where 1 represents the statement that BEST completes the following sentence. I think that important decisions about the sanctuary should be made by...(*write the ranking in the blanks below*)

    a) _____The government.

    b) _____A group of representatives elected by fishers.

    c) _____An organized vote involving all interested fishers.

    d) _____An organized vote involving all interested community members.

    e) _____Other, please specify: _____.

24) Improvements: Rank the following options from 1-6, with 1 being the statement that BEST completes the following sentence. I think the sanctuary could be most improved by...(*write the ranking in the blanks below*)

    a) _____More frequent patrol by wardens and marine police.

    b) _____Allowing access to one of the inner shoals.

    c) _____Moving the entire sanctuary boundary closer to the shore.

    d) _____Allowing access to bait fish (e.g., sprat).

    e) _____Funding to provide better boat access and new gear for fishers.

    f) _____Funding to provide tourism training, tourist infrastructure (e.g., glass-bottomed boats), and certifications.


Thank you again for participating in this survey. If you would like to hear the final results of this research, please provide me with your contact information.

# Appendix D

# Ethics Clearance

Dear Researcher:

The recommended revisions/additional information requested in the ethics review of your ORE application:

Title: Analyzing Changes in Ecosystem Services and Social Wellbeing of Small-Scale Fishing Communities in Response to the Implementation of Marine Protected Areas
ORE #: 20685
Faculty Supervisor: Derek Armitage (derek.armitage@uwaterloo.ca)
Student Investigator: Cheryl Chan (cctchan@uwaterloo.ca)

have been reviewed and are considered acceptable.  As a result, your application now has received full ethics clearance.

A signed copy of the Notification of Full Ethics Clearance will be sent to the Principal Investigator or Faculty Supervisor in the case of student research.


***********************************************
Note 1: This ethics clearance through a University of Waterloo Research Ethics Committee (REC) is valid for one year from the date shown on the certificate and is renewable annually. Renewal is through completion and ethics clearance of the Annual Progress Report for Continuing Research (ORE Form 105).

Note 2: This project must be conducted according to the application description and revised materials for which ethics clearance has been granted.  All subsequent modifications to the project also must receive prior ethics clearance (i.e., Request for Ethics Clearance of a Modification, ORE Form 104) through the Office of Research Ethics and must not begin until notification has been received by the investigators.

Note 3: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects or on the completion of the project.  The Office of Research Ethics sends the ORE Form 105 for a project to the Principal Investigator or Faculty Supervisor for completion.   If ethics clearance of an ongoing project is not renewed and consequently expires, the Office of Research Ethics may be obliged to notify Research Finance for their action in accordance with university and funding agency regulations.

Note 4: Any unanticipated event involving a participant that adversely affected the participant(s) must be reported immediately (i.e., within 1 business day of becoming aware of the event) to the ORE using ORE Form 106. Any unanticipated or unintentional change which may impact the research protocol, information-consent document or other study materials must be reported to the ORE within 7 days of the deviation using ORE Form 107.


Best wishes for success with this study.

---------------------------------
Sacha Geer, PhD
Manager
Office of Research Ethics
NH 1045
519.888.4567 ext. 37163
sacha.geer@uwaterloo.ca