An investigation into Cambodia’s first marine managed area:
Current state, strengths and areas for improvement

Lachlan Barter

Advisor: Jesse Hastings, Ph.D.
University of Akureyri
Faculty of Business and Science
University Centre of the Westfjords
Master of Resource Management: Coastal and Marine Management
Ísafjörður, May 2018
Supervisory Committee

Advisor:
Dr Jesse Hastings

Reader:
Dr Brad Barr

Program Director:
Dr Catherine Chambers

Lachlan Barter
An investigation into Cambodia's first marine managed area: current state, strengths and ways of improved management.

45 ECTS thesis submitted in partial fulfilment of a Master of Resource Management degree in Coastal and Marine Management at the University Centre of the Westfjords, Suðurgata 12, 400 Ísafjörður, Iceland

Degree accredited by the University of Akureyri, Faculty of Business and Science, Borgir, 600 Akureyri, Iceland

Copyright © 2018 Lachlan Barter
All rights reserved

Printing: Háskólaprent, Reykjavík, May 2018
Declaration

I hereby confirm that I am the sole author of this thesis and it is a product of my own academic research.

______________________________

Lachlan Barter
Abstract

Marine managed areas are now a key tool in any coastal managers’ toolbox and are being utilised throughout the world with varying degrees of success. Cambodia’s first Marine Fisheries Managed Area (MFMA) was declared in July 2016, marking the beginning of collaborative marine conservation in the country. The country’s commitment to marine conservation is in keeping with goal number 14 of the United Nations Sustainable Development Goals which instructs participating nations to “conserve and sustainably use the oceans, seas and marine resources for sustainable development”. This research investigates the current state of Cambodia’s first MFMA, utilising grounded theory as its method of data collection and analysis. It allows theory to emerge from the collected data opposed to traditional hypothesis testing methods. A total of 15 semi-structured interviews were conducted with key stakeholders who were or are still involved with the MFMA planning and decision-making process.

These interviews found that the MFMA is in a state of flux due to contributing factors such as: management authority changes, lacking enforcement, insufficient funding and poor awareness within the rapidly developing tourism sector. The main recommendations are that the new managing authority consult relevant stakeholders to address local and regional concerns. The creation of an educational video, to be shown on-board island transportation services is also recommended to increase awareness within the tourism sector. It is crucial for the future of marine management in Cambodia that this area provides a good example for other proposed MFMAs in Cambodia to follow.
Dedicated to Barbara Watts-Barter and John Barter
# Table of contents

Abstract ........................................................................................................................................ v

Dedication .................................................................................................................................. vii

Table of contents .......................................................................................................................... viii

List of figures ............................................................................................................................... ix

List of tables ............................................................................................................................... x

Acknowledgments ....................................................................................................................... xi

Introduction ................................................................................................................................. 1

Literature review ......................................................................................................................... 7

Methodology ............................................................................................................................... 27

Results ......................................................................................................................................... 36

Discussion ..................................................................................................................................... 664

Conclusion and management recommendations ......................................................................... 73

References .................................................................................................................................... 77

Annex 1 ......................................................................................................................................... 85

Annex 2 ......................................................................................................................................... 86

Annex 3 ......................................................................................................................................... 87

Annex 4 ......................................................................................................................................... 88
List of Figures

Figure 1: Cambodia’s location in South East Asia ................................................................. 2
Figure 2: The MFMA and its zoning plan .................................................................................. 4
Figure 3: Sustainable development goal #14 ......................................................................... 8
Figure 4: Stakeholder interaction and participation matrix ...................................................... 10
Figure 5: Maps demonstrating high value conservation areas within the MFMA ............ 23
Figure 6 A map indicating the researchers chosen base in Cambodia ................................. 27
Figure 7: Visualization of the grounded theory coding process ............................................. 32
Figure 8: Word cloud demonstrating the most used words within all categories .................. 33
Figure 9: Core category and associated codes (Insufficient funding) ................................. 37
Figure 10: Core category and associated codes (communication and collaboration) ....... 38
Figure 11: A donation box used within the CFI .................................................................... 42
Figure 12: MFMA Information signage located on Koh Rong Sanloem ................................ 44
Figure 13: An example of some new fast ferries servicing the Archipelago ...................... 45
Figure 14: Concrete anti-trawling device that act to demarcate areas .................................. 48
Figure 15: The Royal group’s master plan of Koh Rong island ............................................. 51
Figure 16: The new marine national park protected area map .............................................. 53
Figure 17: Sea turtle identification educational poster ........................................................... 56
Figure 18: A Free CoralWatch monitoring chart ................................................................. 57
Figure 19: Photos demonstrating the rapid development of Koh Rong ............................... 59
Figure 20: Fishing boats from the village Prek Svay ............................................................ 62
Figure 21: A general framework to inform stakeholder engagement strategies ............... 66
List of Tables

Table 1: Entry fee distribution from the Galapagos islands........................................... 13

Table 2: The proposed MFMA sustainable financing model............................................. 24

Table 3: List of anonymous respondents, ordered by date interviewed.............................. 30
Acknowledgements

I would like to acknowledge each research participant who allowed me to enter their place of work or family home to conduct this research, without you this research would have not been possible. Thank you to my advisor, for all of your helpful comments and critiques. Lastly, I would like to thank my parents, for their guidance, understanding and support throughout the whole research and writing phases.
1.0 Introduction

1.1 Context and purpose of the study

This thesis is a presentation of the current perceived state of Cambodia’s first Marine Fisheries Managed Area (MFMA). Theories and insights are revealed through the eyes of an independent researcher who had no affiliation to any group or government organisation within the study area. This research aims to contribute to the developing field of marine protected area (MPA) management in Cambodia and South-East Asia.

Firstly, the researcher wishes to alert the reader that there is no universally agreed upon definition of Marine Protected Areas (OECD, 2017a). However, the International Union for Conservation of Nature (IUCN) has defined MPAs as: “... clearly defined geographical space, recognised, 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). A variety of management objectives are covered under this definition (all must have conservation as a key objective) with 6 categories existing: (Ia) Strict nature reserve, (Ib) Wilderness area, (II) National park, (III) National monument or feature, (IV) Habitat/species management area, (V) Protected landscape/seascape, (VI) Protected area with sustainable use of natural resources (Dudley 2008).

Marine protected areas now cover 13.2% of the marine environment under national jurisdiction up to 200 nautical miles (United Nations, 2017). MPAs are rapidly increasing throughout the world, yet they often fail to reach their objectives due to many factors such as: poor planning, unsatisfactory consultation with local people, and a lack of suitable enforcement mechanisms to fight off illegal, unreported and unregulated (IUU) fishing (Bennett & Dearden, 2014b; Christie, 2004; Di Franco et al., 2016; Edgar et al., 2014).
The Kingdom of Cambodia is located in South-east Asia (Figure 1) and is home to a population of approximately 16 million inhabitants (United Nations, 2013). Government stability has increased since the signing of the Paris agreement in 1991\(^1\), however many issues still exist within the current management structure including corruption, which has been reported and observed in all levels of government (Feinberg, 2009; Mao, 2018; Sunderlin, 2006). Furthermore, in November 2017, the main opposition party (Cambodia National Rescue Party) was dissolved by the high court of Cambodia, completing a transformation towards an authoritarian regime which began after the Cambodia National Rescue party polled strongly in the 2013 election (O’Neill, 2017). These decisions may affect civil liberty and limit any requirements to consult local people on issues such as marine management (B Sokhean, M Dara, & Baliga, 2017).

\(^1\) The Paris peace agreement signed in 1991 brought an end to the Cambodian-Vietnamese war and led to democratic elections which were held in 1992, under a United Nations administered Cambodia.
The Cambodian coastline is approximately 435 km long running from neighbouring countries Thailand and Vietnam. Within these coastal waters a range of seagrass beds, fringing reefs, mangrove forests and endangered species such as the hawksbill turtle can be found (Mulligan & Longhurst, 2014; Thorne, Mulligan, Mag Aoidh, & Longhurst, 2015). Data regarding the quality and condition of these habitats is sparse, however recently compiled reports suggest that the marine environment is suffering as a result of habitat destruction caused by illegal fishing, sedimentation and island development (Boon et al., 2014; Mulligan & Longhurst, 2014).

Fisheries are vitally important to Cambodia’s food security with the Food and Agriculture organisation of the United Nations (FAO) reporting that up to 75% of all Cambodians daily protein intake comes from fish (FAO, 2011). These fish are mostly caught in inland fisheries, however statistics indicate that a near doubling of marine fish landings from approximately 33,000 tonnes to 75,000 tonnes which occurred from 1993 to 2009 (FAO, 2011). The management of these marine fisheries has been limited to date especially in regard to Illegal, unreported and unregulated (IUU) fishing (European Commission, 2014). As such, in 2014 the European Union (EU) identified Cambodia as a non-cooperating third party in the fight against global IUU fishing and issued the country a ‘red card’ banning the export of any fishery product to the EU (European Commission, 2014).

The coastal archipelago of Koh Rong and Koh Rong Sanloem is located approximately 25km (Figure 1 & 2) off mainland Cambodia and a further 225km from the capital Phnom Penh. The archipelago is made up of villages: Koh Rong Sanloem, Daem Thkov, Prek Svay and Koh Touch (Figure 2). A total of 1633 inhabitants reside within these villages, although this figure may be substantially higher since the last estimate, which took place in 2011 (Fisheries Administration of Cambodia, 2011; Marine Conservation Cambodia, 2011). Interestingly, 41% of these inhabitants are under the age of 18, as a direct result of the brutal genocide carried under the Khmer Rouge, which significantly altered the age structure of Cambodia (De Walque, 2006; Vibol, 2011). These inhabitants are some of the most rural poor in Cambodia and rely on the ocean for food and a source of income (Ministry of Agriculture, 2016).

In 2016, the area was declared Cambodia’s first Marine Fisheries Managed area (MFMA) after 6 years of planning and consultation between various governmental, NGOs and local
stakeholders (*Figure 2*). The MFMA can be classed as a multi-use MPA (category VI) under the definitions set out by IUCN as its vision statement aims “*To establish a marine fisheries management area of Koh Rong Archipelago which locates in Sangkat Koh Rong, Preah Sihanouk city, Preah Sihanouk province to protect, conserve and use marine fisheries resources sustainably aligning with the national policy of the fisheries sector and contributing to poverty reduction*” (Ministry of Agriculture, 2016). This vision statement meets the essential criterion of the IUCN of having nature conservation as a top priority (Dudley, 2008). Furthermore, the zoning plan outlaws (*Figure 2*) all forms of commercial fishing within the MPA in favour of sustainable fishing (Zoning plan is later described in the literature review). Coupled with the objectives and goals of the MFMA found in Annex 4, the researcher is satisfied with the classification of the area as a category IV MPA.

As the MFMA is the first of its kind in Cambodia it was proposed to set an ‘example’ for the rest of the country and the region to follow (Ministry of Agriculture, 2016). Thus, it is important that independent research is carried out to establish what stakeholders think of the MFMA and listen to ideas they may have for its improvement. To enable the collection of this data, this study examines:

- What is the perceived current state of the MFMA according to affected stakeholders?
- Which areas of management need improvement according to affected stakeholders?
- What realistic steps can be taken to improve management, with current constraints?
Figure 2 - The MFMA and its associated zoning plan. Source: Ministry of Agriculture (2016)

This research was granted approval by the University Centre of the Westfjords and the Ministry of Agriculture, Forestry and Fisheries (Annex 3).

The data collection for this research was completed during a 3-month period from November 2017 till late January 2018 in Cambodia. A qualitative research approach was used, known as
grounded theory which utilises a data to theory method of analysis (Charmaz, 2014). A total of 15 interviews were conducted with the length of the interviews ranging from 22 minutes to 60 minutes. Using atlas.ti the collected data was transcribed and coded according to grounded theory research principles. Several limitations were present throughout the research, including: language difficulties, funding limitations and the limited time permitted for data collection.

This thesis follows a logical structure beginning with a concise introduction describing the importance of marine managed areas and Cambodia’s current conservation situation. The literature review is broken into two sections, presenting the requirements that need to be met for marine managed area to be successful (e.g. stakeholder engagement), followed by a review of relevant Cambodian MFMA literature and management plans. The methodology follows next, where the steps and procedures of this thesis are explained. Lastly, a detailed results section is presented outlining the emerging themes and categories of the research, is followed by a concise discussion section and conclusions.

The reader should be aware that after the primary data collection period for this research the MFMA was declared a marine national park by Cambodia’s Ministry of Environment. The proposition of this declaration occurring was discussed throughout several interviews with hopes and concerns raised. At this time, collaboration between the relevant government agencies is rumoured to be ongoing, however the future of the area remains unclear. If talks break down, the possibility for previously collected data to be lost or overlooked in any new management plan exists.
2.0 Literature review

This literature review is broken up into two distinct sections as presented below:

1. A review of papers and reports that explore concepts and theories behind marine protected areas (MPAs) from around the globe. *Note this research focuses on social aspects of MPAs and the following literature review will reflect this.*

2. A review of Cambodia’s approach to protected area management, including marine and fresh water environments. This section explores the creation of Community Fishery (CFi) areas which ultimately led to the designation of Cambodia’s first MFMA. A further section will be devoted to literature specific to the study area, e.g. peer reviewed papers and management plans/policy.

MPAs are now common place around the world and are touted as a potential solution for achievable conservation of coastal environments and oceans (Edgar et al., 2014; Jentoft, Chuenpagdee, & Pascual-Fernandez, 2011; McClanahan, Marnane, Cinner, & Kiene, 2006). The biological benefits of these areas can be seen throughout the world with evidence suggesting that reef fish populations can recover with the closure of fisheries and in areas where this is not possible or equitable, the restriction of non-selective and destructive fishing gears (Campbell, Edgar, Stuart-Smith, Soler, & Bates, 2018). However many MPAs, in both the developed and developing world, fail or struggle to reach their goals and objectives due to numerous reasons, such as: poor planning, insufficient communication with local stakeholders, financial limitations and irregular monitoring (T. Agardy, di Sciara, & Christie, 2011; Chuenpagdee et al., 2013; Day, 2008; Edgar et al., 2014; Gill et al., 2017; Jentoft et al., 2011). When an MPA fails to reach its stated purpose/s, the credibility of this tool is subsequently degraded and its ability to act as an agent for conservation management is diminished (Hilborn et al., 2004; Jameson, Tupper, & Ridley, 2002).
Sustainable development goals (SDGs) drawn up by the United Nations promote a ‘plan of action for the people, planet and prosperity’ (United Nations, 2015). They recognise that eradicating poverty from earth is the biggest challenge faced by the global community. Seventeen development goals have been set out, with the aim of enhancing the Millennium Development Goals. Goal number 14 (Figure 3) is particularly relevant to MPAs as it states ‘[…] conserve and sustainably use the oceans, seas and marine resource for sustainable development’ (United Nations, 2015). This goal consists of 10 targets with number 14.5 stating the aim ‘to conserve at least 10% of coastal and marine areas by 2020; following international law and using best available scientific data’ (United Nations, 2015). Specific targets such as these have been a topic of much debate amongst the scientific community with concerns being raised about the achievability of the targets, biological relevance, political motivation, and many social justice issues (De Santo, 2013; Leenhardt, Cazalet, Salvat, Claudet, & Feral, 2013; Wood, 2011).

Figure 3 - The sustainable development goals as released by the United Nations. Goal number 14 is circled in black as it is the focus point of this research. Source: sustainabledevelopment.un.org
2.1 Stakeholder engagement

The effective conservation of marine environments and the resources that they provide may not be possible if local people and stakeholder groups are not continuously engaged from the beginning stages of MPA planning. Indigenous stakeholders often share an innate bond with the ocean and as primary users; their concerns and knowledge deserve to be heeded and incorporated into management plans (Pomeroy & Douvere, 2008). Historically, the traditional management of fisheries has occurred for centuries within many countries such as: Fiji, Papua New Guinea, Tonga, Hawaii and French Polynesia. These countries practiced a range of management techniques which included: multispecies management and the temporary closure of fisheries for spawning, to name a few (Berkes, Colding, & Folke, 2000; Johannes, 1978). This form of management, known as traditional resource management (TRM) bases the reasoning for many of its decisions from traditional ecological knowledge (TEK) which can be defined as:

“A cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings with one another and with their environment” (Berkes et al., 2000).

TRM techniques often learnt from their mistakes and over time developed a resilience to ecological abnormalities and shifts in climatic state (Berkes et al., 2000). For managers to become aware of local and traditional knowledge they must stop and listen to the community in which they plan to manage, although this may prove challenging as managers may not understand the local complexities and cultural contexts that can play a large role in the development of TRM.

Protected area management has now progressed from top-down approaches where governments often made key decisions without stakeholder input, to inclusive management where consultation and engagement is often a legal requirement throughout the decision making process (Dovers et al., 2015). Developing these partnerships between government and local communities requires significant effort, trust and mutual understanding between both parties.

---

2 Stakeholder groups can be defined as, “all parties who will be affected by or will affect [the organisation’s] strategy” (Nutt & Backoff, 1992).
For this to occur, government departments often undertake a stakeholder analysis to gain an understanding of local issues and social processes at play in the local community (Dovers et al., 2015; Pomeroy & Douvere, 2008; Voyer, Gladstone, & Goodall, 2012). Within Cambodia, the consultation of local and indigenous people is required under the Protected area law of 2008, which states that officials of the nature and conservation administration (under the Jurisdiction of the Ministry of Environment) have the right and duty to:

“Promote education and dissemination among the public and coordinate with local indigenous communities to participate in the preparation and implementation of community protected areas” (The Kingdom of Cambodia, 2008).

Stakeholder analysis techniques focus on the identification of key stakeholders within communities, exploring their personal or professional interests and objectives while simultaneously noting their intercommunity relationships. These interests are plotted against the project goals to determine the level of consultation necessary. Management must decide which stakeholders are entitled to engage in the decision making process and the amount of power they are afforded (Pomeroy & Douvere, 2008). Strategies are developed to keep all stakeholders satisfied with their level of involvement based on their expressed interest in marine projects (Figure 4).

Figure 4 - Stakeholder interaction and participation matrix. Managers must decide to what level stakeholders will be involved in the decision-making process. Source: (Pomeroy & Douvere, 2008)
Stakeholder interaction should not end after implementation of managed areas as it is crucial that communication continues throughout enforcement and monitoring stages to ensure support for the MPA and mitigate any conflicts that may arise (Walton A, Gomei M, & Di Carlo G, 2013). It is also key to communicate the results of enforcement efforts and habitat monitoring with stakeholders in a clear and transparent way that is easily understandable, to people of all educational levels (Di Franco et al., 2016). A failure to continuously engage stakeholders can lead to abrupt changes in public opinion, and as seen in the Balicasag Island MPA (case study 1), where those who once supported the area may have returned to illegal fishing as major decisions occurred without local input (Christie, 2004).

### Case study 1-

During the 1990’s the Philippines national government adopted a hands off approach to marine management and passed laws to begin decentralisation, allowing for the creation of community managed areas (Christie, 2004). The Balicasag island MPA initially had the support of local residents, however this support was short lived when the National Tourism Authority effectively (central government agency) took over the island, developing resorts, diving businesses and the majority of incoming tourist dollars (White & Vogt, 2000). Local residents were not consulted throughout this process and ultimately began to resent the MPA as it severely restricted their ability to fish, while providing no other livelihood alternatives (Christie, 2004). Furthermore, for many locals the only benefit was a larger tourist market of which they could sell t-shirts and sea-shells. Ultimately, this unfair distribution of MPA benefits has caused once supportive local residents to engage in illegal fishing activities, undermining the purpose of this MPA (Christie, 2004).

Further examples of communication failure can be found on the Andaman coast of Thailand, where the local villagers reported that a network of 17 MPAs had negative impacts on fisheries
and agricultural livelihoods, due to a lack of support for the development of: cultural, social, financial and infrastructure assets (Bennett & Dearden, 2014b).

2.2 Marine protected area financing

Sufficient financing of MPAs in both the developed and developing world is becoming increasing difficult. The rapid expansion of these areas throughout the world has left many governments unable to provide adequate funds for effective long-term policy implementation (Adams et al., 2008; Eagles et al., 2013; Thur, 2010; Whitelaw, King, & Tolkach, 2014). A lack of funds from government sources has left some agencies underfunded and understaffed, resulting in sub-optimal performances by marine managed areas (J.-L. Chen et al., 2014). To cover this gap, managers have sought funds from a wide range of sources to develop sustainable financing of marine areas. These mechanisms include, but are not limited to: corporate sponsorship, user entry fees, souvenir sales, payment for ecosystem services and grants.

Corporate sponsorship is increasingly used form of diversification within funding streams chosen by marine area managers around the globe. This is partly due to a shift in the private business sector which has shown its willingness to support protected area conservation as the attitudes of their consumers change and corporate social responsibility is demanded (Tai & Chuang, 2014). Marine protected areas in Jamaica found that businesses were willing to exchange or pay for the use of park logos or endorsement on their product or services, betting that this investment will increase their appeal to the eco-conscious tourist (Geoghegan, 1998). Several examples of this willingness to invest can be found around the world, e.g. the car manufacture Jaguar, have sponsored the conservation of Jaguars for over 20 years and in the Seychelles a major banking organisation has sponsored the purchase and maintenance of waste bins for marine protected areas (Emerton, Bishop, & Thomas, 2006). Furthermore, the Department of Conservation in New Zealand has partnered with Air Zealand to gather funds necessary for monitoring and research, as they are legally unable to charge a user entry fee (New Zealand Government, 1980). To date over 7.3 million New Zealand dollars has been donated to the department for monitoring and research, in addition to free advertisement on inflight entertainment and magazines (https://www.airnewzealand.co.nz/sustainability-nature-and-science).
Entering into commercial partnerships is not free of risks, managers must make careful decisions to not enter into agreements with companies whose ideals may differ with that of the protected area. The level of power afforded to donors needs to also be carefully evaluated as to not create perceptions that the decision making process has corrupted or overly influenced by an outside power (Marine Protected Areas Federal Advisory Committee, 2017).

The collection of voluntary taxes has been explored in an Asian context throughout China, the Philippines, Thailand and Vietnam (Nabangchang-Srisawalak et al., 2016). It was found (through surveys) that electricity consumers were willing to add a small monthly surcharge to their bill for the conservation of marine turtles. The majority of respondents said they were only willing to pay a miniscule fee; however, a small portion of the respondents were willing to pay at least 1 USD a month, equating to a potential untapped resource of 50 million USD. The study noted that for the collection of this voluntary tax, a transparent and fair collection mechanism that reached across borders would need to be developed (Nabangchang-Srisawalak et al., 2016).

The tourism sector has also been targeted to make up lacking funds with many MPAs implementing user entry fees. Marine managers who chose to follow best practice (J. Hastings & Yeang, 2014) usually conduct willingness to pay surveys, (WTP) by which tourists give an account of how much they would be willing to donate to conservation efforts in the area (Gelcich et al., 2013). Mangers should however be somewhat wary of WTP surveys as they have been known to over-estimate the amount users are willing to pay as they are simply surveys and respondents are not forced to actually give any money to the cause (Blomquist, 2001). For example a study was carried out on the island of Saint Lucia where locals were asked how much they would pay for a high quality energy-efficient lightbulb with 94% of respondents stating that they were willing to pay a premium price for the high quality (Reynolds, Murray, Kolodinsky, & Howell, 2015). Yet, when presented with coupons to buy these lights at the average price returned from the survey only one third of the consumers actually purchased one (Reynolds et al., 2015).

Examples of user such fees are common throughout the world, e.g. Adults must pay $100 to enter the Galapagos islands (https://www.galapagosislands.com/travel/transportation/entry-fees.html).
This fee is then equitably distributed throughout various Ecuadorian government departments for conservation and other issues as displayed in Table 1.

Table 1- Entry fee distribution from the Galapagos islands. Adapted from: https://www.galapagosislands.com/travel/transportation/entry-fees.html

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Percentage of funds (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galapagos Immigration</td>
<td>10</td>
</tr>
<tr>
<td>Ecuadorian Navy</td>
<td>5</td>
</tr>
<tr>
<td>Consejo Provincial de Galapagos</td>
<td>10</td>
</tr>
<tr>
<td>Galapagos Municipalities</td>
<td>25</td>
</tr>
<tr>
<td>Galapagos Marine reserve</td>
<td>5</td>
</tr>
<tr>
<td>Inspection and quarantine services</td>
<td>5</td>
</tr>
<tr>
<td>Galapagos national park</td>
<td>40</td>
</tr>
</tbody>
</table>

Other examples of success user entry fee mechanisms include: The Great Barrier Reef marine park, Australia who charge $6.50 for full day access (Great Barrier Reef Marine Park Authority, 2016), The Bonaire National marine park in the Dutch Caribbean charges $25 for SCUBA diving and $10 for all other marine park users (Bonaire National Marine Park, N.d; Thur, 2010) and Raja Ampat Marine Park, Indonesia (1 million-rupiah, annual pass). Furthermore, the Bonaire National park has utilised user entry fees to be fully self-sufficient, since 1992. Entry prices were even raised in 2005 with minimal effects on tourist visitation which ultimately resulted in a 760,000$ annual revenue that far exceeded operational costs, allowing for nearby beneficial conservational activities to commence (Thur, 2010). Similarly, entry fees to a national park in Nepal were found to be much lower than tourists were willing to pay, suggesting a need for more willingness to pay surveys (Baral, Stern, & Bhattarai, 2008). However, it is not advised to solely rely on user entry fees as this can put marine area funding at risk, due to the tides and ebbs of tourism which can be heavily effected by natural disasters, political turmoil and global economic downturns (Erdmann M. et al, 2003; OECD, 2017b).
The sale of souvenirs can also form a play a somewhat smaller part in the sustainable financing of marine areas. Local partnerships can be enhanced if stakeholders are given a central role in the development and production of crafts of sale which can also at as an alternate income source. For example, the Roatan marine park in the Honduras has successfully created and sold MPA related merchandise and souvenirs that bring in up to a third of their total revenue (https://coral.org/blog/tourism-marine-protected-areas/). It is key that, management be wary not impinge upon local livelihoods if crafts are already being sold at a proposed protected area.

Grant funding is another key source of finances that marine managers often utilize to cover their operational costs. Many MPAs rely on international assistance from aid agencies, development banks (i.e. the World Bank), NGOs and private conservation donors such as the Global Environmental Facility (GEF). Grant funding however is usually intended for establishment purposes, enabling marine areas to develop their own sustainable financing mechanisms for ongoing funding (OECD, 2017b). For example, GEF has invested over one billion dollars into conservation projects since the 1990’s making this organisation the single largest conservation minded donor in the world (Global Environmental Facility, 2010; J. Hastings, 2013). Grant funding usually contain preconditions that management must align with the donating organisations ideals and goals, while also submitting to regular evaluation.

Lastly, donation boxes are another supplementary mechanism to gather funds for protected area management. While donation boxes are often underutilised by both managers and tourists alike, they can provide an alternate form of funding for parks. A survey was conducted in Japan at the Daisetsuzan national park (2015) to assess ways of maximising donations to their park. They found that donation amounts were moderately increased (non-significant, >0.05) and contributions rates from tourists were significantly increased from 67.5% to 81.6% (significant, <0.05) when participants were given simple information about the fundraising activity and the amount of funding already received from government sources (Kubo, Shoji, Tsuge, & Kuriyama, 2018).

2.3 Payment of ecosystem services
Payment of ecosystem services (PES) are another funding stream available to marine managers. PES are based on two premises: those who benefit from the ecosystem pay for its conservation
(e.g. tourist companies who offer for profit scuba dives) and the ‘maintainers’ of these services are compensated for their work (OECD, 2017b). For such a payment scheme to be introduced in a MPA, the value that the particular ecosystem service provides must be measured and assessed which often proves difficult due to poor property rights in the marine environment and mobile ocean assets (IIED, 2012). On a global scale, efforts are being made to research the applicability of PES and climate change mitigation in coastal environments, where mangroves and seagrass beds are known to store carbon (OECD, 2017b; Wylie, Sutton-Grier, & Moore, 2016). These efforts are being mainly undertaken under the guidance of the United Nations Framework convention for climate change.

To date, examples of successful PES schemes are few perhaps due to the emerging nature of the research area. However, a locally managed mangrove restoration project in Mikoko Pamoja, Kenya has proved to be a successful flagship of PES and climate change mitigation. The community led mangrove restoration and reforestation project is underway, benefiting the local community while also being fully financed by the international purchase of voluntary carbon credits (Wylie et al., 2016). These credits can be purchased by any public or private group, however difficulties exist due the volatile carbon credit market and trouble locating buyers for carbon credit (Wylie et al., 2016).

### 2.4 Governance

MPAs require the support of governing bodies (where they exist) to be successful as they may find a need to place restrictions upon development, commercial fisheries and limit entry to the general public (Christie & White, 2007). They also require laws to be in place that enable the collection of user entry fees if deemed necessary. Managers must work with government to decide upon the necessary laws and come to an agreement on the management structure of an MPA. These management regimes can be categorized under the following approaches but are not limited to: top-down management, co-management, bottom up management and TRM. Each method has been employed throughout the world with varying success due to the many complex management issues which each MMA faces.

Top down approaches where a centralised agency controls the decision making process have proven to relatively unsuccessful in developing nations, with many MPAs failing to meet their
goals and targets due to poor governance and a lack of transparency (Bennett & Dearden, 2014b; Christie, 2004; Hind, Hiponia, & Gray, 2010; Horigue, Aliño, White, & Pressey, 2012). However, bottom up approaches which empower local communities have proved to be more fruitful in developing nations where government institutions are weak and corrupt (Christie, 2004; White & Vogt, 2000). It is crucial that this approach has functioning conflict resolution mechanisms and efficient collaboration networks, otherwise local disagreements have the potential to derail conservation efforts (Christie & White, 2007).

Traditional approaches to management (TRM) stem from age-old knowledge (TEK) in areas such as the Pacific Islands where local people had practiced seasonal fishery closures and multi-species management for centuries (Rubble, 1994). These approaches were not accepted by the scientific community for many years (they still struggle for acceptance against western scientific knowledge) until the field of TEK became prominent with local indigenous populations being valued for their knowledge (Berkes, F, Berkes, M, & Fast, 2007; Huntington, 2000). TRM is key to many marine areas throughout the Indo-Pacific region, with efforts to coordinate projects under a network known as the Locally Managed Marine Area Network or LMMA (http://lmmanetwork.org). LMMA operates in 7 countries including: The Philippines, Indonesia, Palau, Papua New Gineau, Solomon Islands, Fiji and Pohnpei. The network consists of community members, donors and university staff who are all committed to improving governance of MPAs.

TRM areas generally do not fall under the IUCN’s definition of MPAs as they typically do not have conservation of resources as their primary aim, rather their sustainable use. However, IUCN does recognise that some areas outside of their strict definition and categories may contribute to the effective in-situ conservation of biodiversity. These areas are known as ‘Other area-based conservation measures’ and are referenced in the AICHI targets (IUCN, 2018). Efforts to combine these areas with MPAs are ongoing and may be necessary if there is a possibility of achieving 10% conservation of coastal and marine areas (United Nations, 2015)

Co-management regimes fall in the middle ground between top down management and community led management (bottom up management). Government officials and local communities share power, both having the ability to drive policy direction and make strategic decisions (Christie & White, 2007; Sen & Raakjaer Nielsen, 1996). Constant stakeholder engagement through
transparent and equitable mechanisms is crucial in maintaining key relationships between local community leaders and government officials. MPAs that employ co-management schemes may be significantly more expensive to implement than their centralised counterparts, however the long-term benefits of community support and engagement often recuperate any additional extra outlay of funds (Clifton, 2003). It must be noted that true co-management agreements are hard to find aside from in textbook examples as it is rare that government institutions afford communities equal power.

2.4.1 MPA enforcement

It is critical to the success of any MPA that the regular enforcement of rules and regulations provide a deterrence for illegal fishers who seek to violate the established rules (Di Franco et al., 2016; Edgar et al., 2014). Managers must make decisions depending on the levels of funding available to them, however literature suggests that a large portion of successful MPAs around the world have efficient and high levels of enforcement, allowing areas to reach their biological targets and goals (Edgar et al., 2014; McClanahan et al., 2006). If MPAs are not adequately enforced, illegal fishing can occur within their boundaries, essentially declaring the area a ‘Paper Park’ where goals and targets are set but no real action is taken on the ground (Pieraccini, Coppa, & De Lucia, 2017). Alternative approaches to enforcement may be considered by management if the resources to enforce are insufficient (McClanahan et al., 2006). If this is the case, McClanahan et al (2006) suggested that, management should focus on meeting community goals and improving general educational levels as this may prove more successful and critically less expensive than active patrolling.

2.5 Livelihood transition

Within MPAs, managers and government often seek to provide alternative livelihood programs for local residents to supplement any losses from reduced fishing capacity or forced area closure (Bennett & Dearden, 2014a). Transition from resource extraction based economies to tourism based economies is common within MPAs where activities such as: SCUBA diving, recreational fishing, boating, snorkelling, and eco-tours are promoted (M. T. Agardy, 1993). Examples of this transition are plentiful, as are the lessons to be learnt, for example in South Korean and Taiwan fishermen have opened their homes and fishing vessels to tourists, offering recreational fishing
trips and SCUBA diving to supplement their income (C.-L. Chen & Chang, 2017; Cheong, 2003). Furthermore, fishermen in Scotland have opted to take tourists out on their vessels to observe whales to cover shortfalls (Woods-Ballard et al., 2003). In conjunction with government planning and policies, which should be aimed at improving any skills that fishermen may lack (i.e tourism know how and marketing) fishermen have proven their willingness to utilise their skills as anglers and navigators to embrace a transition towards tourism-based activities (C.-L. Chen & Chang, 2017; Woods-Ballard et al., 2003).

2.6 Protected area history in Cambodia

The 1993 Royal decree on the protection of Natural areas was the first law or regulation that protected areas of high conservation value in Cambodia (The Kingdom of Cambodia, 1993). Under this decree, the Ministry of Environment became responsible for overseeing the protection of 23 areas with a total land mass of around 3,273,300 hectares. Three further protected areas were proclaimed protected five years later, when Cambodia became a member state of the RAMSAR convention, which entered into force in late 1999 (https://www.ramsar.org/wetland/cambodia). However, this Royal decree did not contain any framework or guidance for the management of protected areas, thus in 2008 another Royal decree was released defining proper procedure for issues such as: community consultation, indigenous rights, categories of protection (including zoning management), and the responsibilities of the managing authority (The Kingdom of Cambodia, 2008).

At the time of writing, Cambodian law places protected areas into 8 categories (The Kingdom of Cambodia, 2008):

1. National Park
2. Wildlife Sanctuary
3. Protected landscape
4. Multiple use area
5. RAMSAR site
6. Biosphere site
7. Natural heritage site
8. Marine park
Each protected area is legally required to consist of a four-zone management system, which upon review of available literature must be implemented for every site under the control of the MOE (The Kingdom of Cambodia, 2008):

1. **Core zone**- Areas for the protection of threatened and critically endangered species where access is prohibited except for MOE officials and researchers with prior approval. Natural resource use is highly prohibited. National security and defence sectors are exempt.

2. **Conservation zone**- management areas of high conservation value located next to core zones, access is not permitted without prior approval. Infrastructure development is prohibited. National security and defence sectors are exempt.

3. **Sustainable use zone**- intended for the management of areas with high economic value which may contribute to local community livelihood improvement. Development may be approved in this zone.

4. **Community zone**- areas for the socio-economic development of local and indigenous communities. Uses can include residences, paddy fields, gardens etc.

2.7 Fishery management conservation in Cambodia

Fisheries management in Cambodia is the responsibility of the Ministry of Agriculture, Forestry and Fisheries (MAFF), who have traditionally managed fisheries through the allocation of a commercial lot system which sold fishing rights to the highest bidder (Ratner, 2006). This allocation occurred until the 1990’s when the majority of lots were returned to the public due to concerns over local food security, popular protests and a visit to rural fisher communities by Prime Minister Hun Sen (Ratner, 2006). As a result, Cambodia became the first Asian country to enable the community management of fisheries (FAO, 2017). Unfortunately, this announcement took many officials and fishermen by surprise and the production of guidelines for how to establish and manage these community fisheries (CFIs) remained undefined until a Royal decree in 2006 and the 2007 fisheries law. These laws later outlined: the handover of power to community lead organisations, tenure arrangements and ways of funding. Article one of the Royal decree states:
“All Khmer (Cambodian) citizens have the right to join together to establish community fisheries in their own local areas, on a voluntary basis and taking the initiative to improve their own standard of living by using fisheries resources sustainably to contribute to economic and social improvement and poverty alleviation. The Ministry of Agriculture, Forestry and Fisheries shall have general jurisdiction over management of community fisheries” (The Kingdom of Cambodia, 2006).

This law gives all Cambodians the right to join a CFI if they reside in a village with the CFI area and are over the age of 18. CFI duties include: managing and conserving resources, respect instructions from MAFF and the Fisheries department, guarantee equal rights in the sustainable use of the resource, implement by-laws and formulate ways to tackle crime, enter into agreement with the Fisheries department to manage the resource and keep all documents related to the CFI (FAO, 2017). CFIs cannot sell any area or erect any structure without approval from MAFF. They have further rights to organise fishing activities and actively assist fishery officers to stop violations (FAO, 2017). While they have the power to do the aforementioned activities they are ultimately still under the control of MAFF.

A total of 460 CFIs throughout Cambodia, have been registered with MAFF, with 39 CFIs being located in coastal regions of Cambodia (Chea Phalin, 2014; FAO, 2017). The majority of these remaining 421 CFIs are located around the largest freshwater lake in South East Asia, called Tonle Sap. These fisheries are crucially important to food security within Cambodia and are the back bone to many rural family diets (WorldFish, 2013). There are numerous peer reviewed papers and reports that investigate the state of these CFIs and ways for their continued improvement (FAO, 2017; Krishna et al., 2017; Ratner, 2006; Sok, Yu, & Wong, 2012; Sreyphrea, Touch, & Diepart, 2016).

Firstly, the right to fish in each community CFI is not only available to CFI members but also to outsiders if they follow the set regulations (Sreyphrea et al., 2016). This presents a dilemma to community fisheries management as members of individual CFI’s are likely to be more accountable to its rules and regulations due social pressures and raised awareness levels, while non-members do not face the same social pressure and are generally less aware of the CFI rules (Sok et al., 2012; Sreyphrea et al., 2016). Thus, for these reasons it is suggested that illegal
fishing remains a significant problem which is further exacerbated by a lack of funding for patrolling or enforcement and non-existent regulations on fishing catch volume (FAO, 2017; Krishna et al., 2017; Ratner, 2006; Sreyphea et al., 2016).

In what was possibly the largest study conducted to date, the FAO interviewed 1095 CFI members from 60 different CFI groups from 16 provinces across Cambodia (FAO, 2017). They found 17 key points to be applicable throughout their studies with 7 main points being:

1. CFIs are significant as a people’s organisation with participation of men, women and young people.
2. CFIs have reached their goal of ensuring rural communities have access to fish for food and livelihood improvement
3. Respondents consider conservation as key to sustainability with the role of women being especially notable in promoting conservation successes the ‘moral economy’.
4. Illegal fishing is a central threat to CFI success, especially when the illegal fisher is supported by influential persons. Women are critical to upholding the ‘moral economy’ in regard to IUU fishing.
5. Non-government assistance is crucial, however the role of respected and resourceful people within communities needs to be continually considered.
6. Development of human capacity is crucial to CFI success.
7. Community fisheries have helped to alleviate poverty; however, benefits should be more fairly spread.

Overall, Cambodia was assessed as having made a good start towards community based fishery management with state support (FAO, 2017). Significant steps still need to be made to improve governance, reduce illegal fishing and develop CFI human capacity. Developing this capacity may prove challenging as it has been identified that education levels within some CFIs are very low with the average fisherman/women not receiving more than 4 years of formal education (Sok et al., 2012).
2.8 Koh Rong Archipelago literature review

As previously stated, Cambodia’s first MFMA was declared in June 2016, marking a significant step into organised marine management efforts in Cambodia. The MFMA, covering 405km², governs the waters around the Islands of Koh Rong and Koh Rong Sanloem under the guidance of MAFF. As such, the adopted zoning plan (Figure 2) falls under the mandate of MAFF, separate to the above categories and zones defined by the Ministry of Environment. The need for some form of protection was identified by local villagers and government agencies who recognised that the archipelago is becoming a tourist hotspot for holidaying and diving, however the ecosystems which they come to see face many threats, e.g. illegal fishing (Ministry of Agriculture, 2016).

Three CFIs exist within the Koh Rong Archipelago MFMA (Figure 1): Prek Svay (2003), Koh Rong Sanloem (2008) and Daem Thkov (2010). Extensive studies have occurred within the Koh Rong Archipelago to assess the social demographic conditions within local villages, the condition of local fisheries and coral reefs (Boon et al., 2014; Marine Conservation Cambodia, 2011; Thorne et al., 2015; Vibol, 2011).

Boon et al (2014) presented the zoning process in a peer reviewed format before establishment of the MFMA. Using reef check survey data provided by Coral Cay Conservation, the team was able to produce an initial zoning plan (containing 6 zoned areas) using the program Markxxan with zones (Thorne et al., 2015). This plan identified areas of high conservation value (Figure 5) taking into account factors such as coral diversity, fishing pressure and sedimentation. Fishing pressure (Figure 5) was identified as being highest to the north, north-east and southeast of Koh Rong Island; while also being highest in M’Pai Bai and the southeast of Koh Rong Sanloem (Boon et al., 2014). The zones presented in this paper were taken into consideration by management and played a critical role in developing the final zones for the MFMA. These finalised zones include; (1) Conservation areas, (2) Protected areas, (3) Community fisheries areas (CFI), (4) Fisheries refugia areas, (5) Recreational use areas, (6) Multiple use areas.

Thorne et al (2015) presented a national reef check method adapted to fit Cambodian reefs and conditions of the surveyors. This method is intended to be used in all other surveys to enable a continuous data set from before and after the proclamation of the MFMA. The use of a
A standardised national method for reef checks could be very advantageous for Cambodia and marine conservation in general as it provides a simple method that can be easily taught and can act as an early warning system to marine managers (Hill & Wilkinson, 2004).

Figure 5 - (Left) High value conservation areas, indicated by dots. (Right) Fishing pressure within the MFMA. Source: (Boon et al., 2014)

The social demographic status of the main villages have been extensively studied and recorded to ensure livelihood baseline data was collected before the proclamation of the MFMA (Marine Conservation Cambodia, 2011; Vibol, 2011). These reports found that literacy levels were relatively high throughout most communities, with approximately 70% of all respondents indicating they are literate, except for village of Koh Touch where the percentage was less than 50%. It was identified that this could pose a problem for local people to take advantage of increasing tourism related opportunities (Vibol, 2011). Occupations within island community were also said to be still heavily reliant on the fisheries sector, which makes up a total of 46% of all occupational activities (Marine Conservation Cambodia, 2011). The reader should note
that this data is over 7 years old now and may not reflect the current situation on the islands as tourism has rapidly expanded in the past 5 years.

Further studies have been conducted by Flora and Fauna international to determine a plausible sustainable financing mechanism for the MFMA (J. Hastings, 2013; J. Hastings, 2016; J. Hastings, Thomasberger, & Reitz, 2015; J. Hastings & Yeang, 2014). These studies recommended a sustainable and benefit sharing mechanism, to be implemented in three phases over a period of 5 years (Table 2). Key recommendations of the mechanism included widely accepted sustainable financing methods such as: user entry fees determined by WTP surveys, equitable distribution of funds, souvenir sales and exploration of PES into the future.

Table 2 - The proposed MFMA sustainable financing model. Source: (J. Hastings & Yeang, 2014)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect voluntary donations for the MFMA's management costs</td>
<td>Collect entrance, diving and boating, and concession fees, as well as continue to collect voluntary donations</td>
<td>Join Cambodia Bay Trust Fund (if established) and negotiate regional-scale benefit-sharing</td>
</tr>
<tr>
<td>Create a sub-group of the TWG and a segregated bank account to manage and receive funds</td>
<td>Govern the funds through a multi-sectoral stakeholder committee at the provincial level, likely a sub-group of the KRA MFMA TWG</td>
<td>Sell KRA MFMA souvenirs</td>
</tr>
<tr>
<td>Crack down on illegal activities within the MFMA and fine perpetrators</td>
<td>Distribute funds to CFIs, Preah Sihanouk provincial government departments (including FIA), the Ministry of Economy and Finance, as well as for an open fund for entrepreneurial projects.</td>
<td>Explore other financing options, including Payment for Ecosystem Services (Carbon Finance and Watershed Protection)</td>
</tr>
<tr>
<td>Build financial capacity of CFIs</td>
<td>Fund distribution percentages (%) should be determined through stakeholder negotiation, adhering to principles of need and equity</td>
<td></td>
</tr>
<tr>
<td>Determine the fee amounts through WTP surveys and immediately begin negotiating distribution options with relevant stakeholder groups</td>
<td>Prepare tags/labels for distribution</td>
<td>Prepare KRA MFMA souvenirs for sale</td>
</tr>
<tr>
<td>Educate tourism operators as to the need for and use of fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare and lobby for the necessary legislative framework to allow fees for the MFMA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A structured management plan for the MFMA (2016-2020) is available detailing how management plans to reach its goals and targets (Annex 3). The plan presents a legitimate time frame and allocated budget for projects which enable the MFMA to reach its goals; such as:
demarcation, surveying and public awareness campaigns. Risks and assumptions are listed for each activity giving the reader a clear idea of management decision making (Ministry of Agriculture, 2016). The management plan sets out to be adaptive to changes in the local community as and such requires regular review to remain up to date.

Management of the MFMA has been clearly set out at the provincial level, with the provincial management committee (PMC) consisting of 16 national and provincial government members coordinating management tasks as designated by MAFF. Below this, is the site specific technical working group (TWG) which consists of private sector members, CFI leaders, NGO representatives, and government members. The TWG aim to implement the management plan, raise awareness, monitor and report on the progress of livelihoods and conservation success. The minutes and outcomes of these meetings are passed down to relevant organisations through various communication channels (Ministry of Agriculture, 2016).

2.9 Concluding remarks
This literature review has presented a range of information about MPAs and covered important topics such as: Stakeholder engagement, MPA financing options, governance, enforcement and livelihood transition examples throughout the world. Highly cited peer reviewed papers have been referenced and their findings used appropriately. All relevant and obtainable Cambodian MPA literature has reviewed, with the aim of providing the reader with some context on the current happenings in Cambodia. It has identified a uniquely Cambodian approach to fisheries management called CFIs and detailed strength and weaknesses of this approach. Finally, the current state of knowledge regarding the chosen site has been presented to the reader to again provide context.
3.0 Methodology

The researcher relocated himself to the coastal town of Sihanoukville (Figure 6), Cambodia for a four-month period from November (2017) to February (2018) to conduct the necessary research. This location was strategically chosen as it is located approximately 25km from the islands of Koh Rong and Koh Rong Sanloem allowing for relatively easy access to the study islands, via high-speed ferries or local supply boats. The location is also conveniently connected by bus (5 hour ride) to Phnom Penh, where interviews took place.

![Figure 6 - A map indicating the researchers chosen base. Source: Googlemaps.com](image)

This research was conducted as a case study utilising a method of data collection and analysis called grounded theory (Charmaz, 2006; Corbin & Strauss, 2008; Glaser & Strauss, 1967; Strauss & Corbin, 1990). It has aimed to interview a representative cross section of stakeholders who are or have been involved in the MFMA. This research utilised qualitative methods that included the use of semi structured in-depth interviews which asked broad and open-ended questions as is standard with grounded theory methodology. By following grounded theory methodology from start to finish this research provides a unique and independent view into stakeholder opinions, experiences and perceptions within the MFMA. A thorough literature
review was conducted after data had been collected (which is standard to grounded theory research) where an understanding of key issues, best practices and ways of improving engagement within marine managed area regionally and worldwide is displayed. All methods used throughout this thesis are described with this chapter.

3.1 Grounded theory approach
This research has utilised grounded theory which is most commonly used in qualitative studies as it employs an inductive method of data collection by which the researcher allows theory to emerge from the data (Strauss & Corbin, 1990). Grounded theory juxtaposes traditional deductive methods of data collection, where theory is proved or disproved against data. Traditional hypothesis testing methods were deemed not to be appropriate as the area of interest is under-researched and realities on the ground may not have been foreseen accurately from outside of the Kingdom of Cambodia. Further to this point, as the MFMA was recently declared in 2016, no independent research had yet been conducted on its current state and capacity to reach its goals and targets under political, environmental, social and financial realities in the study area.

Grounded theory also provides other advantages to the researcher aside from the reasoning above. According to Charmaz (2014) it gives the researcher systematic, yet flexible guidelines for conducting qualitative research that are sometimes lacking in qualitative studies. Being able to conduct interviews without having pre-conceived theories to test, allowed for the research to obtain original and thought-provoking data, while at the same time minimising the amount of bias being brought into the line of questioning. This meant that the researcher could derive meaning from the collected data and subsequent analysis without having the added pressure of having to prove or disprove a theory. However, the grounded theory method of investigation does have its critics who state that it is an exhaustive process that produces large amounts of data that may be hard to manage (Hussein, Hirst, Salyers, & Osuji, 2014), there is not one agreed universal method limited generalizability of grounded theory (Hussein et al., 2014) and finally that grounded theory seeks to find new theory rather than confirm theory which leaves found theory without confirmatory evidence (Polit & Beck, 2010).
Using this methodology, it was necessary for the interview questions to be broad, wide reaching and open ended in the aim to gather as much data as possible (Charmaz, 2014). As such a varying interview guide for each group of stakeholders (NGO, government, business) was developed for use, which was altered as emerging themes came to the forefront of the research.

3.2 Semi-structured interviews
This thesis has adopted a non-probability sampling frame, known as judgment or purposive sampling with interviewees being chosen based on their involvement or perceived involvement in the MFMA (Bernard, 2012). This decision was made due to the high workload, in-depth nature of the interviews, awareness of the MFMA and the limited research time frame. A total of 15 key informant interviews were conducted (14 singular and 1 group) during the field research period (Table 3). The length of interviews conducted ranged from 22 minutes to over 60 minutes. Respondents were verbally made aware that the researcher was an independent masters student who had approval to conduct the study from the University center of the Westfjords, Iceland and the Cambodian Ministry of Agriculture, Forestry and Fisheries (Annex 3).

Participants verbally gave their consent that allowed their answers to be used anonymously in aid of the study. It was also the choice of the participant if they permitted voice recording to occur. Accordingly, if respondents chose to not proceed with the recording only notes were taken, while if they allowed recording to occur they were given the assurance that this was anonymous study. Participants were also offered a copy of the interview transcript which could be sent to the participant, via email for their approval. They were further informed that the recording would be securely kept for the duration of the project (in a password encrypted file) and subsequently deleted after completion.

It is important to note that the interview guide (Annex 1) was used strictly as a guide and deviations from the ‘script’ often occurred when the respondent offered up information that had the potential to provide rich data. At the beginning of each meeting, the researcher would discuss with the respondent's that this is an opportunity to express their opinions and experiences in a safe and anonymous environment with no repercussions for themselves or their
organisation. It was further put to the respondent that they should view this interview as discussion or a ‘chat’, where they could tend to incoming guests, phone calls and other day to day business in the hope of minimising formalities and creating an environment conductive to sharing stories with an independent researcher. This discussion atmosphere would continue right throughout the meeting with the researcher remaining in the background while still asking the necessary questions and probing points of interest (Charmaz, 2014).

Table 3.0 List of anonymous respondents, ordered by date interviewed. The choice of alias letter does not reflect the names of participants in any way.

<table>
<thead>
<tr>
<th>Alias</th>
<th>Associated to</th>
<th>Location interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent A</td>
<td>Local tourism sector</td>
<td>Koh Rong Archipelago</td>
</tr>
<tr>
<td>Respondent B</td>
<td>NGO/ Local tourism sector</td>
<td>Koh Rong Archipelago</td>
</tr>
<tr>
<td>Respondent C</td>
<td>Local tourism sector</td>
<td>Sihanoukville</td>
</tr>
<tr>
<td>Respondent D</td>
<td>Local tourism sector</td>
<td>Sihanoukville</td>
</tr>
<tr>
<td>Respondent E</td>
<td>Local tourism sector</td>
<td>Sihanoukville</td>
</tr>
<tr>
<td>Respondent F</td>
<td>Authorities</td>
<td>Sihanoukville (Group interview/translator)</td>
</tr>
<tr>
<td>Respondent G</td>
<td>Authorities</td>
<td>Sihanoukville (Group interview/translator)</td>
</tr>
<tr>
<td>Respondent H</td>
<td>Authorities</td>
<td>Sihanoukville</td>
</tr>
<tr>
<td>Respondent I</td>
<td>Authorities</td>
<td>Phnom Penh</td>
</tr>
<tr>
<td>Respondent J</td>
<td>Authorities</td>
<td>Koh Rong Archipelago (Translator)</td>
</tr>
<tr>
<td>Respondent K</td>
<td>NGO</td>
<td>Phnom Penh</td>
</tr>
</tbody>
</table>
As seen in Table 3, the location of the interviews varied for each participant, with most occurring at their place of work. As previously stated, the researcher was based in Sihanoukville to allow for direct access to the capital and the remote islands, however it was necessary for interviews to be conducted in blocks to allow for travel time between locations, unforeseen circumstances and financial restrictions.

The interviews themselves covered a wide range of topics relating to the MFMA, depending on the participant’s involvement, position and knowledge of the MFMA. Wide reaching questions were designed to gather detailed information that would allow for the development of new theory, with the aim of providing answers for the research questions of this thesis (Annex 1). Due to the elevated level of political tensions in the study area a logical format was given to the question guide, with simple and straightforward questions at the beginning of interviews to foster conversation, with more sensitive issues were placed in the middle section of the interviews. While there was structure to the interviews, this frequently changed according to the atmosphere and level of sharing in the interviews with non-crucial lines of questioning being dropped or added at the judgement of the research to gain as much rich data as possible, while aiming to keep the interview conversational (Charmaz, 2014). The reader should also note that trigger words such as ‘weakness’ or ‘failure’ were avoided and replaced with less confrontational wording, e.g. areas for improvement or lessons learnt. This was especially important to avoid offence with individuals who had worked for extended periods of their life on this project and were unfamiliar with the researcher.
For most interviews, English was not the respondent’s native or first language. As such the researcher often adjusted his rate of speech and use of words that require a high English proficiency. Respondents were encouraged to ask for the question to be repeated in an alternative manner if they did not comprehend the premise of it. This was also the case for the singular interview where a translator assisted, whose English was also limited.

After all interviews, detailed notes were taken in addition to those taken during the conversation. This was to allow for the researcher to reflect on what had occurred, the themes that were discussed and other points or matters of interest that may have been missed in the interview setting. Using this method of reflection, the researcher became more involved with the data, allowing for emerging patterns to be identified and compared with previously conducted interviews, a key aspect of inductive collection of data (Charmaz, 2014).

3.3 Data analysis

The data collected throughout this research was analysed according to the grounded theory method using a qualitative analysis software called atlas.ti. This method involves three steps of coding: open coding, axial coding and selective coding or phasing (Strauss & Corbin, 1990). The process of coding, when used in qualitative studies is a key step of analysis in which the researcher attaches a describing word or phrase that summarizes a portion or section of data.

![Diagram of grounded theory coding process](image)

*Figure 7 – Visualization of the grounded theory coding process.*
Open coding began once all data had been collected and entered into atlas.ti. This process is defined by Strauss and Corbin (1990) as the analytical process of ‘breaking down, examining, comparing, conceptualizing and categorising data’. All data was coded once using the open coding process before being re-examined a second time to verify that the researcher was satisfied with the codes and their relationship to the phases or ideas they describe. Axial coding then took place with the codes being closely investigated for any relationship to each other and subsequently being placed into larger categories if relations were found (Figure 7).

![Word cloud demonstrating the most used words within all categories.](image)

After the completion of this extensive process the final stage of data analysis known as selective coding or phasing was conducted. Selective coding is the process by which a core category is chosen that relates to all other categories in the analysis (Strauss & Corbin, 1990). This category is key to developing the narrative of which all other sections of the research fall into. Lastly, theoretical memos were taken during this process and contained the researchers ideas about the relationships between codes, a key aspect of grounded theory where constant comparison is demanded (Glaser & Strauss, 1967).

3.4 Final literature review

An early literature review was conducted for the purposes of gaining approval of this project and to allow the researcher to gain a basic understanding of the processes in play in the study.
area, before interviews were conducted. The early creation of a literature review goes against the traditional model of grounded theory by Glaser & Strauss (1967) as it has the potential to limit the researcher’s ability to walk into situations with an open mind. It was unavoidable, and some knowledge was necessary to be able to discuss management solutions with high level participants, which is an acceptable reality according to Charmaz (2014).

As seen in chapter 2 the literature review focused on reviewing relevant literature and is broken up into two distinct sections: A review of relevant literature focusing on attributes that are necessary in any marine protected or managed area for it to be successful (Christie, 2004; Di Franco et al., 2016; Edgar et al., 2014; Gill et al., 2017; Pomeroy & Douvere, 2008; Pound, 2009) This is followed by a review of South east Asian regional marine managed area literature and Cambodia specific papers, including a review of management plans for the MFMA (Bennett & Dearden, 2014b; Boon et al., 2014; Fisheries Administration of Cambodia, 2011; J. Hastings, 2013; J. Hastings et al., 2015; J. Hastings & Yeang, 2014; Hind et al., 2010; Marine Conservation Cambodia, 2011; Thorne et al., 2015)

3.5 Limitations of the study

This study had some limitations that may have affected the collected results and they are explained in the following sections.

3.5.1 Translators

Due to the researcher being a native English speaker there was an obvious language barrier which prevented some discussions occurring with non-English speakers, such as local fishermen. Subsequently, this research does not contain any interviews with local fishermen, which may have impacted the attitudes and opinions presented as the fisherfolk may have had very different views towards the MFMA. Interviews in Khmer were significantly more difficult to organise in an unbiased way because of the tight knit nature of the small island communities. While only two interviews were conducted with a translator present owing to the chosen sample group, it was not possible to tell if bias had been introduced by the translator, as there was a lack of English speakers who were capable of performing translation services at a cost which the research could afford within the study area as the researcher was completely self-funded
fully independent translators were not able to be included due to their high daily rates. The amount of travel to the study location was also somewhat limited as the ferry costs were high and became a factor to consider when planning interviews and meetings.

3.5.2- Outsider effect

As the researcher was not well known to the island communities, there was a noted reluctance to fully divulge opinions on issues that could have possible repercussions for the participant. This was not the case with more educated participants as they understood the necessity of independent research. Additionally, obtaining contact information and scheduling interviews proved to be very difficult and time consuming as an outsider with many emails and phone calls going un-returned, however Facebook proved to be a successful medium for contact; even for officials. To account for this delay, the researcher extended his stay to be gain as much data as possible.

3.5.3- Stakeholder contact

Unfortunately, not all stakeholders could be contacted due the short study time, their availability and language issues. Representatives from all relevant government ministries were not contactable for an interview. However, the researcher was satisfied that data saturation had occurred with the respondents who were interviewed. The absence of interviews with fishermen means that their view on the issue went unheard and is worthy of investigation in the future.
4.0 Results

The interviews conducted for this study presented a wide range of ideas, opinions and experiences. Using atlas.ti a total of 41 open codes were assigned to the collected data (Annex 2). A total of 8 categories were formed during the axial coding data analysis phase:

1. Insufficient funding (Core category)
2. Education
3. Enforcement
4. Communication and collaboration (core category)
5. Governance
6. Island development concerns
7. MFMA awareness
8. MFMA planning and structure

The following figures visually represent the relationship of the two core categories and their assigned codes assigned. The remaining 6 categories and their codes are located in Annex 2.
Figure 9 Insufficient funding and its associated codes. Each arrow represents the relationship between each code and its parent code (axial code). The codes are either associated to or caused by the parent (axial) code.
Figure 10 Communication and collaboration and its associated codes. Each arrow represents the relationship between each code and its parent code (axial code). The codes are either associated to or a part of the parent (axial) code. Codes are placed according to frequency.
4.1 Insufficient funding

This complex theme was a constant point of discussion throughout the interviews, with each respondent (100%) stating that they felt a lack of funding was impacting the MFMA in some manner. No other theme was discussed or mentioned in every interview. A total of 7 codes were assigned to this theme (Figure 9) due to the complex and varied nature of the answers given by respondents.

The category of insufficient funding combines many wide-ranging codes, with the code most frequently applied being ‘sustainable financing’ (42 times). Exploring this code was key to the research analysis as it provided many insights into what the stakeholders thought was potentially the biggest hurdle or challenge facing the MFMA. Consequences of this lack of funding were on full display during an interview with a respected business owner within the Koh Rong Archipelago (Respondent A) where the purpose of the MFMA was questioned:

‘…. Unfortunately, I don’t think it’s (MFMA) even close to that at the moment (intended purpose/s of the MFMA) because of the lack of funding to implement necessary procedures. It would be nice to say its working the way we think it all should, but right now it’s definitely not….’

The consequences of a lack of funding is again heard with respondent I when discussing what impact patrols currently have on deterring IUU fishing.

‘…. ideally we would have patrols going out every day and for longer, but that requires much more funding…. Ideally, we would have CFI’s or whoever is based on the island all the time to be able to do these patrols and enforce what happens, again we need the funding for this”.

A lack of funds is also affecting the ability of management and government agencies to conduct awareness and education activities which are described under the management plan. When discussing the impacts of increasing tourism and recreational water activities with respondent F and I, funding was described as the main challenge preventing work from occurring:
“… we want to tell them not to anchor on the coral reef area and provide areas for better anchoring so for (government agency) a lot of action but we don’t have enough budget… We don’t have enough. So that’s the main challenge”.

4.2 Sustainable financing

The MFMA management team has attempted to research and implement a more sustainable and transparent way of raising and collecting funds to cover operational costs for the medium-long term. Several reports have been handed down, recommending sustainable financing mechanisms and reviewing progress towards fund collection, which include a mix of tourist entry fees, voluntary donations and international assistance (J. Hastings, 2013; J. Hastings, 2016; J. Hastings & Yeang, 2014). This research found that sustainable financing was also a prominent point of discussion amongst interviewees, with the code being used 42 times.

At the time of writing, a 2$ is fee being charged by the provincial government of Preah Sihanouk for each purchased return tourist ticket to Koh Rong and Koh Rong Sanloem. This fee is charged directly to the ferry company with the reported purpose being for preservation and biodiversity conservation projects determined by the provincial government (Chakrya, 2017). Details remain unclear regarding the exact collection mechanism; however media reports have indicated that ferry companies are required to report their monthly passenger numbers to the provincial hall in Sihanoukville, who then charge accordingly (Chakrya, 2017). Consequently, one of the key sustainable financing options suggested in the aforementioned reports is not available for utilisation by management who also at this time do not receive a share of the current fee (Respondent I). This setback was a key point of discussion with respondent N who explained some of its ramifications for proposed solutions:

“…However, other government agencies and local government agencies have also instilled a fee which is also one of the mechanisms that was also recommended. Forming that kind of group (collection committee) has become very difficult because there is an existing fee. We are advocating that the fees in place are not part of what our partnership has put in place, it’s totally separate. It obviously limits what our mechanism can do, so right now we are working on looking at other funding streams to go ahead with”.
Previously to this $2 provincial fee, several attempts had been made by certain organisations to collect fees at the various docking points around the Archipelago. Respondents A and C both explained during discussions that this was possibly conducted in a sub-optimal manner, with tourists being stopped on arrival and a fee being imposed upon them with little to no explanation of what they were contributing towards. Tourists had already paid for their return ferry tickets were reportedly unhappy at an additional un-advertised fee being imposed, subsequently complaints were made towards the relevant government ministry and the fee was quickly removed.

Additionally, voluntary donations are reportedly being collected with the funds being directly channelled to the CFI’s and their conservation efforts (Respondent N). The donor or amount of voluntary funding is unclear and a concerted area-wide effort to collect donations is yet to be seen. It should also be noted that the willingness to pay (WTP) survey conducted in 2014 found that foreign tourists were willing to pay $5.57 as an entrance fee (J. Hastings, 2016). Theoretically, tourists may still be willing to pay or donate $3.57 to the MFMA for conservation purposes, even if they have already a $2 fee. This theory is supported by Baral et al (2008) who found that tourists in a Nepalese national park were willing to pay significantly more than the current entry fee, to support conservation activities if they felt it was worthwhile.

Furthermore, there is currently no fee being charged to divers or snorkelers who participate in activities inside the MFMA. Fee collection from snorkelers or SCUBA divers is widely practiced around the world (i.e. The Great Barrier Reef authority charges 6.50$ for reef entry) and as recommended by Hastings & Yeang (2014) it is an alternative source of sustainable financing. The reader should be made aware that at the time of this research talks had begun to investigate the implementation of voluntary diving donations that would directly feed into MFMA conservation (respondent I). Additionally, as previously discussed no local taxes exist in the study area and the researcher could not identify any public knowledge surveys or inquiries into the willingness of private businesses (western and local owners alike) on the islands to voluntary contribute towards the management of the MFMA.

The creation of the sub-group for the transparent collection and oversight of funds is slow moving despite discussions and meetings as explained by respondent K:
“...we are not a decision maker and we can try and push to get a sub-group, but it took two years and the provincial government still not really support that idea yet. That is why we try to find other channels to reach and to get a better process to improve our financing”.

This theme of alternative funding or ‘channels’ is re-occurring throughout several interviews with respondents (C, M, N, O). Ideas were raised regarding the diversification of funding streams through corporate sponsorship of patrols and facilities, a small voluntary tax on local and western businesses located on the islands and the improvement of donation boxes and their locations.

The location and presence of donation boxes was discussed by respondents (A, E, I) who each felt their current contribution to the management funding was minimal at best due to poor location choices and un-interesting donation box design (Figure 11). In one instance, the researcher noticed a donation box sitting open on a table next to a row of fishing households, located in an area where tourists rarely visited (Personal observation, 2017). The utilisation of donation boxes as a way of fund collection is widely adopted in national parks and other protected areas around the world (Kubo et al., 2018). Yet, they often return very little in terms of actual funds to management as discussed by both respondents H and N.

Figure 11 – A donation box used within the CFI. ©Flora and Fauna International
4.3 MFMA awareness

The emerging themes from this category paint a picture that is still under development, with high levels of awareness of the MFMA amongst local communities but very low knowledge from the tourism sector and new stakeholders (Flora and Fauna International, 2017). The category ‘MFMA awareness’ was assigned 6 codes with the most frequently used being ‘Awareness issues (21)’, followed by ‘MFMA laws and regulations awareness (11)’.

Levels of awareness amongst local fishermen and communities emerged from the research as being very high, following research conducted by FFI. This awareness was discussed by respondent’s G, H, J, K who all expressed pride relating to the high level of knowledge regarding fishery law, techniques of fishing allowed within the MFMA and the zoning regulations in place. This is directly juxtaposed by the awareness levels of foreign business owners (excluding the diving sector) within the study area. A lack of awareness extends to most tourism operators, restaurants and new stakeholders who now reside within Archipelago. In personal communication with a local hostel owner, the researcher discovered that during their short time on the island (1 year) they had not been informed that they were living right next door to the MFMA. Respondent N raised this concern about western and foreign awareness during a discussion:

“We have very good interaction between the local fisheries teams and local communities but there is actually a huge expat and private sector audience that isn’t getting engaged now”.

In fact, respondent B has a MFMA information poster located in her/his premises which attracts many foreign tourists. Yet, the respondent indicated that his/her knowledge of what these zones stood for outside of the poster to be non-existent as no contact from the MFMA management had been made during her/his time in the archipelago. This lack of awareness extends to management activities, with respondents (A, B& D) indicating that they had no knowledge of any management initiatives.

Respondents interviewed who did have knowledge of the MFMA brought forward their various opinions on what they deemed to the purpose of the MFMA. The code ‘aware of the MFMA many purposes’ was used 9 times to describe data compared to the code ‘conservation first
MFMA purpose’ which was used 4 times. Respondent B was aware of the need for MFMA to cover many areas such as: livelihood improvement, sustainable fisheries, conservation of reefs, education and tourism. This sentiment of multi-layered purposes was echoed by respondents (F, G, H, I, L, M, N, O). However, some participants noted that they thought the most important purpose was to protect the reefs for the benefit of tourists, so they can see ‘a beautiful reef, with lots of fish’ (D & E).

Current awareness raising campaigns were not a theme brought up throughout the course of these interviews, with the exception of discussions regarding the new signs and posters which exhibit the zoning of the MFMA and some activities that are prohibited. At the time of writing, signs and posters (Figure 12) are the primary awareness raising tools being used by management.

Figure 12 - MFMA information signage located on Koh Rong Sanloem

Although there was limited knowledge of plans being implemented to engage the new tourism sector (at the time of writing) the understanding that this issue is a pressing one and needs immediate attention was professed by respondent N who stated:

“The next step which is a challenge is engaging the new businesses and the western/international audience as well as the ferries in Sihanoukville. The community know what is going on but the business community and the international business community have their own judgement and are also less aware of what is going on”.

44
The introduction of fast ferries to transport passengers to and from the island occurred recently in late 2013, with old converted wooden fishing boats previously being the only form of transport available (Xiang, 2013). Since this time, many fast ferries (Figure 13) have commenced services with at least 6 business now running regular boat trips (Personal observation, 2018). Accordingly, in 2015 tourist numbers were expected to reach 150,000 by the provincial tourism department of Preah Sihanouk (J. Hastings et al., 2015). Respondent H also stated, ‘that on busy periods such as holidays the island could receive as many as 2,000-3,000 visitors per day’.

Figure 13- An example of some new fast ferries servicing the Archipelago. Source: www.buvasea.com

4.4 Enforcement

This category was created as it accurately represented the relationships of 7 codes that it contained. These codes and their frequencies are listed here: Regulating and patrolling IUU (49), demarcation need (10), Non-discriminant enforcement (5), MFMA size (4), SMART system (3) and improved fisheries (2). Not all codes were deemed to be relevant to the research and as such all the aforementioned codes will not be presented below.

Fishery patrol discussions explored a range of issues that are perceived to exist within the current programs. First and foremost, was the issue of safety when conducting night patrols. The state of patrol boats and equipment available (life jackets and torches) was expressed to be in need of upgrading to improve safety conditions, along with the purchase of night vision equipment to aid in locating IUU fishers (respondent J). Respondent K stated:
“...we need better equipment such as better flash light, better life jacket because it needs to be more safe during the night time and even the boat. For example, in the night time if the boat is broken it’s very hard to call in people, so we need to be sure everything is secure”.

These night patrols occur twice a month (respondents A, G, H, J, K, N & M) while day patrols occur four times a month. The amount of money given to patrollers is capped at $4 a patrol (could be considered low for the number of hours spent patrolling), however increasing the night allowance is planned to attract more volunteers and allow for added risks that the night patrollers face (respondent K). All patrollers are volunteers (members of the CFI) who have received basic training from the Fisheries department and are aware of the procedures to operate the on-board tracking GPS. Attracting additional volunteers is especially important as it has been identified that most of the illegal activities occur after dark, when patrolling is more dangerous and less frequent (Flora and Fauna International, 2017). The dangers and consequences of lacking night time patrols were explained during an interview with respondent I:

“... we face problems and we still don’t have enough support and the patrolling activities are still not very sufficient... I mean we have very small boats and then also it dangerous for the people working during the night time and that’s when most of the illegal activity occurs and it’s hard for us to control...to prevent illegal activity”.

The interviews also suggested that the local communities were proud of patrolling and its efforts to keep the fishing grounds for the local people only. New patrol uniforms were recently issued in late 2017 and it was reported that they brought great pride and respect to those permitted to wear them (respondents N & M). Additionally, it was stated that an influence on local and non-local fishermen to follow regulations was a sense of fear from being caught (respondents G, K, L).

Local CFI patrol team members do not have the power to issues fines or arrest offenders, this is reserved for fishery officers from FIA and institutions such as the Royal navy and police (J. Hastings, 2016). This lack of power is not unusual with the CFI context, however it should be noted that two other CFIs in Cambodia have negotiated temporary powers to hold offenders until officers arrive from the FIA (FAO, 2017). Due to this lack of statutory power the regular
patrol team are tasked with identifying illegal activity hotspots and taking notes of observed illegal activities rather than intercepting. This information has proved very useful and now informs team members of the best route to take when officials are on-board (respondent K).

No official schedule of attendance that mandates a minimum presence of officials on the patrols was found over the course of this research, however officers are required to have a presence on the islands at least 2 times per month to conduct education (respondent G &H). Furthermore, at this time officers capable of arresting offenders are only located on the Cambodian mainland which results in the delayed prosecuting and apprehending of offenders. This matter is further compounded during night patrols, when no public form of transport is available to the study area. This issue has been discussed for many years and there seems to be movement on creating a base for permanent officers within the MFMA, however this is funding dependant (respondent N).

4.4.2 MFMA as an attractive fishing ground

Despite these legal challenges and funding issues, patrolling efforts have reportedly seen an 80% drop in illegal activities (since the beginning of the MFMA) such as: cyanide and dynamite fishing, based on reports from ground level sources (respondent I). This drop in illegal activities should be treated with caution as no information was provided regarding the number of incidents before and after the MFMA implementation and over which period the drop took place. This drop in illegal activities has caused some concern regarding the capacity of patrolling groups to manage the potential increase in fishery stock (I). Anecdotal evidence according to respondents suggests various fisheries are recovering in the study area (F, I &J). Furthermore, respondent G felt that current restrictions on local people and their fishing methods within the MFMA would increase fishery stocks, hence the area would be more attractive for outsiders. They were concerned that this would make the situation more challenging to manage under current funding and personal limitations. This concern is also raised by Edgar et al (2014) which reported that effective enforcement was one of the 5 key features that influence MPA success.
4.4.3 Demarcation need

Several attempts have been made to demarcate the 6 zones (*Figure 2*) with marker buoys, however all attempts to demarcate have failed thus far, with reasons for their disappearance remaining unclear (respondent’s C &D). Physical demarcation is the chosen method for this area, mainly due to a lack of technologies available (e.g. GPS) according to respondents (A, B,C, I, N & M). The need to demarcate is well known, as it is critical that local fisherman and diving groups are aware of their location and do not unknowingly enter a zone where their activity is prohibited. At this current time, it is very easy for groups to accidentally enter restricted areas as explained by respondent C:

“...no, no one has any idea. We have a rough idea from the map (zoning map) but yeah... I think at the moment it’s not well enforced and in the very beginning stages”

Many local NGO’s, businesses and other organisations have expressed their desire to assist with the demarcation of the MFMA. The utilisation of concrete structures (*Figure 14*) as they are affordable and act to prevent trawling while simultaneously providing safe mooring points for diving and transportation boats to moor onto. The use of concrete structures (*Figure 14*) is not unique to the study area, as they are currently being deployed by Marine Conservation Cambodia to demarcate a nearby island which is touted to become the second MFMA in Cambodia.

*Figure 14* -Concrete anti-trawling device that can act to demarcate areas. Source [www.marineconservationcambodia.org](http://www.marineconservationcambodia.org)
4.4.4 Equitable enforcement

This topic was raised only within three interviews; however, it presents valid suggestions that should be discussed. Enforcement is crucial to the success of the MFMA, yet there is concern from certain sectors, based on previous experiences in Cambodia that enforcement may not always be fair and equal as explained by respondent C:

“In Cambodia, there is a law that everyone must wear a helmet, but if you look at the road now you will see 6 or 7 people riding by just now with no helmet on... I hope it (the MFMA) does not go the way where you can buy your way out of a fine or simply get out of it because of your nationality... if for example diving companies are fined all of the time but others can say they don’t care it (the MFMA enforcement) won’t work properly”.

Further to this point, respondent L exclaimed that punishment should be uniform for all illegal fishers who are caught doing the wrong thing, no matter which organisation or country they belong to. This would result in the playing field being levelled for local fishermen who are already following the laws and would be punished to the full extent of the law if they broke them.

As previously stated, the MFMA encompasses over 405 km² of ocean located around the two main islands of Koh Rong and Koh Rong Sanloem. The main island of Koh Rong has 2 CFI’s who share the load for patrolling the surrounding waters, however Koh Rong Sanloem only has one CFi with the responsibility falling on them to patrol the surrounding waters. Several respondents (A, I & J) felt the MFMA was too large when compared to current capacity and resources. This feeling was particularly emphasized by respondent A who stated:

“M’pai bay (CFI), the area is just so huge, it goes all the way around the around the island and it’s just not possible to enforce an area like that with what the (patrol) team has”.

4.4.5 SMART monitoring system

The SMART monitoring system (Spatial monitoring and reporting tool) is a tool for managers of protected areas to enable efficient and visual representation of their enforcement activities. It was developed and maintained by 9 active partners, including but not limited to: Global Wildlife Conservation, North Carolina Zoo, World Wild Life fund and Frankfurt Zoological
society (http://smartconservationtools.org/). The tool is used to better record all infractions and to track patrolling efforts allowing for improved data analysis and motivation of rangers.

SMART has been successfully utilised (respondents I, L & N) by the MFMA management with its main purpose of aiding CFIs and management to better plan future patrols based on collected data. It has enabled management to identify gaps in night time patrolling and perceived illegal activity hotspots. This system requires GPS trackers to be with patrols at all time and there are some small difficulties with language barriers as the system is not available in Khmer (Cambodian) at this time (respondent K).

4.5 Governance
This category has been assigned 5 codes and they are as follows: Transparent decision making (28), National park benefits and risks (12), Research permission (4), CFi disappointment (3), Conservation and development balance (3).

The sustainable financing mechanism recommended by J. Hastings (2013) requires the clear and transparent collection of funds enabled through the creation of a working sub-group. To date, this sub-group is non-existent because of resistance at the provincial level to measures that may increase accountability (respondents I & K). This lack of oversight directly effects the capability of any further fund collection though alternative streams as previously mentioned i.e. corporate sponsorship and entry or diving fees. An example of this lack of oversight and transparency was given by respondent A where it was explained:

“At another pier, that’s located on the island started charging people on their own... so people (Tourists) were getting double charged. One of my guys told me this as customers were unhappy about paying 2 entry fees so we had to go and fix the problem. It turned out that some guy was charging people 2$, with no explanation and he was not even in uniform”.

This lack of transparency also extends to the proposed development of the islands. A lack of trust regarding the developers and government intentions was mentioned several times with fears that the development will not occur in a fair and equal manner (A, C, D & O). The
developers, the Royal Group\(^3\), have a 99-year lease on Koh Rong island and have developed a master plan (Figure 15), however respondents noted that a failure to develop the required infrastructure have led to confusion over the projects time frame, the likelihood of the project proceeding and future of the island (A &I).

4.5.1 National park increased powers and risks

The creation of a new national park and the associated change of governing agency (Ministry of Environment), was regularly discussed by respondents who felt that this opportunity offered many potential avenues to increase the success of the area, however there was a noted sense of

\(^3\) The Royal Group are a Chinese backed development group who current hold a 99- year lease over the development of the islands. They plan to develop the area as seen in the masterplan (figure 14), including a airport, golf course and 5 star resorts.
caution towards any potential takeover and its associated risks (respondent A, C, F, I, K & N). First and foremost, the creation of the national park would provide substantially increased powers to the managing authority when compared to the powers held by the Fisheries department and MAFF. The creation of a national park in Cambodia requires a sub-decree to be signed by the Prime minister of the Kingdom of Cambodia. The current managing authority (MAFF), have no legal domain over development on the islands within the area and is limited to managing the surrounding water. A lack of respect for the MFMA was expressed by a respondent as the current legal grounds on which the MFMA stands are deemed to not be very powerful (respondent I).

The potential for a positive impact of the national park creation was explained by respondent N where they stated:

“I see it as a great opportunity, everything we spoke about: strengthening partnerships, getting more enforcement in place and actually get more money to the site would be an opportunity through the Ministry of environment. If work can be done within the existing legislation, policies, communities and TWG that are already operating, I think this can be an overall positive for the area”.

Conversely, concerns were also raised about the creation of a national park and the ramifications it could have for local communities, management activities and development of the island. Communication and consultation was expressed as being crucial to aiding any transition of power, especially with existing managers and advisory panels who have spent many years developing strategies and plans to promote sustainable fisheries, improve livelihoods and conserve the natural environment (respondents A, F, G, H, I, K & N). Additionally, all research and experimental conservation activities (coral farming and restoration) require approval through the fisheries administration. This requirement allows for some management of activities and keeps all relevant stakeholders informed and allows involvement if parties deem it necessary (respondent I). No information has been publicly released relating to this matter and if approval will be necessary under a possible new national park.
4.5.2 Declaration of Cambodia’s first marine national park

On the 8th of February 2018, Cambodia’s first marine national park was established by a sub-decree, signed by the Cambodian Prime minister; Mr Hun Sen (Channyda, 2018; Vannak, 2018). The new national park replaces the MFMA and mandates a transfer of power from MAFF to the Ministry of Environment (MOE) who have significantly more statutory power than the former managers. For the first time, the area will include land zones (excluding land committed to public use and private land) with the aim of the park being to “protect the natural resources and biodiversity of the islands, while promoting ecotourism initiatives with a small ecological footprint” (Vannak, 2018). A total of 52,448 hectares of water are included with 5,311 hectares of land, afforded protection under the sub-decree (Figure 15). The decree mandates cooperation between government ministries and agencies which include the MOE and MAFF (Channyda, 2018). However, the intentions of MOE remain unclear, with no publicly available information at the time of writing. It is unclear if the co-management structure already functioning within the MFMA, will remain in place or if a shift towards centralised management will take place. This lack of clarity extends to all aspects of the MFMA.

Figure 16 - The new marine national park protected area map. Source: Phnom Penh post
including: zoning, fishery laws, community engagement, patrol teams, resort development and educational efforts.

The reader should note that this declaration occurred after the primary data had been collected for this research. Thus, the presented research references the possibility of the national park being created as opposed to a certainty of its creation.

4.6 Communication and collaboration

This category was created as it best represented the relationships between 7 codes which discussed communication and/or collaboration (Figure 10). The codes in order of frequency are: Communication channels (48), Inclusive monitoring (21), successful management activities (18), Clean up dives (5), conflict management (4), research data availability (3), bottom up management (3). Only major codes will be discussed below.

Communication channels were the largest point of conversation within this category and presented both positives about the levels of communication and areas for improvement. Communication is acknowledged to be good with original and long-term partners of the MFMA (NGO’s and some private business groups). Communication is enabled through a variety of mediums such as regular in person visits, email communication and the TWG meetings (respondents A, C, D, H, I, N). Special mention was given to the success of the TWG meetings where communication and opinions are expressed in an environment conductive to collaboration (respondent C). This collaboration extends to new research and development ventures who must present their project for advice and awareness raising (respondent I).

Communication with new stakeholders is poor to non-existent as previously stated and identified by management. The prohibitive costs of communication and a lack of English speaking fishery officials (respondent K & M) are reported to be hampering these efforts. New stakeholders, even those involved with management to some degree reported that they were unaware of key management activities set out in the management plan. They also felt that management could do better in assisting them to implement and plan their own activities that could benefit the area (respondent B & N).
Inter-group communication is limited since the collapse of the network of ‘concerned organisations’ in 2014/15 (respondent N). Reasons for the collapse in communication stemmed from loose organisation and prohibitive time and monetary constraints (respondent’s N & M). Improvement of collaboration between groups was recommended by several respondents (A, I, N & M) as there are many organisations within the study area, who aim to conserve the local environment while enriching local lives. Activities such as demarcation could benefit from improved collaboration and resource sharing in an area where significant capacity gaps exist (e.g. English teachers, heavy lifting equipment, demarcation efforts). Stakeholder collaboration is key for the success of any natural resource management area, thus understanding central figures in every social network group is vital to communication success (Cárcamo, Garay-Flühmann, & Gaymer, 2014). Collaboration networks can be disjointed, lack cohesion and fail to exchange of data if key bridging points are not in place or at least identified (Cárcamo et al., 2014). No plan was presented to the researcher indicating that any social network analysis had been conducted during this research.

Regular communication of research initiatives, current happenings and changes in law are absent according to respondents (A, B & N). No information sharing vehicle is distributed by management, which has led to stakeholders being unaware of management activities and the potential of missed funding opportunities, although one respondent indicated Facebook may be a cheap and effective way of communication into the future (respondent N). Successful strategies to keep stakeholders informed of everyday activities include: the distribution of regular newsletters via email or paper, notice boards, pamphlets, press releases and TV interviews/advertisements (Pound, 2009).

4.6.1 Successful management activities

Several indications were given towards what makes a management activity successful from the respondents interviewed, with two successful activities often mentioned being: World ocean day and sea turtle education. The first activity was successful due to wide community involvement and support, fun engaging activities (e.g. boat races, movies) and global support (respondent N & O) Similarly, sea turtle identification and handling education with local communities (Figure 17) was also very successful. This was reportedly successful as a well-
respected teacher from the American National Oceanic and Atmospheric Administration was brought to the islands, in addition to the activities being ‘hands on’ (respondents A, F, I, M, N & O).

![Image]

Figure 17- Sea turtle identification educational poster.

4.6.2 Inclusive monitoring

During 2017, little to no monitoring was undertaken within the MFMA as a direct result of capacity reduction and changing donor goals of a main partner involved. Because of this, new capacity is currently being built by management to enable the future collection of data in a manner that is uniform and scientific (respondent N). These new stakeholders are currently involved with seahorse and seagrass monitoring, in collaboration with existing stakeholders (respondent M). Gaps still exist in management's capacity to effectively monitor coral reefs, and as such citizen science approaches are being investigated (respondent D & N). Citizen science monitoring of coral reefs is a widespread practice around the globe with many lessons to be learnt before implementation in Cambodia. Examples of successful programs are plentiful, e.g.
CoralWatch Australia (www.coralwatch.org), who partner with project AWARE (www.projectaware.org) to raise awareness about coral monitoring and bleaching worldwide. This project is a citizen science effort developed in conjunction with the University of Queensland, Australia. They offer, free DIY coral survey charts (Figure 18) and identification information as well as a platform for data collection and collation. Free access to all collected data provided via their website, where all conducted surveys are displayed.

![CoralWatch Monitoring Chart](https://www.coralwatch.org)

*Figure 18- A Free CoralWatch monitoring chart. Source: www.coralwatch.org*

### 4.6.3 Clean up dives

This code was expressed several times by respondents, who all displayed a similar reaction to any organisation of these dives. Respondents (B, C & D) suggested that there was a lack of organisation in respect to clean up dives with no regular dives being organised by management or diving companies, except for when clients request them even though this is a direct management objective as found in the management plan.

### 4.6.4 Research data availability

To date, research conducted by management is not easily accessible to the general public, with the exception of the new scientific journal called ‘Cambodian journal of natural history’ (https://www.fauna-flora.org/publications/cambodian-journal-natural-history). This lack of accessibility proves also to be true for management plans, budgets and policies of which the
researcher could find no available copies online. Returning data to those who have participated was recommended by respondent (E) as she/he felt that if there was reports that showed the data they contributed, people would get excited and feel as if they are making a difference.

4.7 Island development
This significant category represents the relationships between 5 different codes, which are as follows: sustainable development concerns (38), Terrestrial pollution and waste management (16), Eco-tourism potential (5), Critical infrastructure needs (3), Regional economy significance (2).

The first and most significant emerging theme of this category is the high level of concern over the sustainable development of the islands, with concerns over the quality and rate of development expressed. While not in the aims of the MFMA, the quality of infrastructure and housing is crucial to the tourist experience in a saturated market with the likes of Thailand and Vietnam competing for business. This was explained by respondent A who said:

“I think Cambodia is at a cross roads, they will end up losing a lot of western tourism if they continue to build poor quality accommodation instead of taking the time to build quality and train staff... The islands are going towards tourism that’s for sure, but this could decide whether numbers rise or fall when they can go to a country next door and get a bungalow for 8 $ which they would pay 40$ for here and the service is a whole lot better over there”.

These concerns expand to the rate of land clearing which was described as having the potential increase terrestrial run off (respondent C & O). Respondents expressed that an island development plan should be developed to include development codes and mandated inter-governmental cooperation in tourism related manners. This development plan needs to strike a balance between exploitation and conservation (respondents A, C, F, I, K, N)

The rapid expansion of the main tourist hot spot Koh Touch has created many new jobs for local people, but it has however brought new infrastructure challenges and development is required (Figure 19). This direction could be given under the new national park, which would have jurisdictional power to manage land development.
4.7.1 Terrestrial pollution and waste management

The rapid development as discussed above has caused serious problems to develop, especially in relation to the treatment of waste water and solid waste on the islands (respondent E, H, I, N & O). These problems were laid out by respondent H:

“It’s polluted (the area), I would say uncontrolled. If you go there at the moment you will see some houses, restaurants and bungalows that connect their waste water and also solid waste directly into the sea”.

This problem is further expatiated by a lack of investment from the private sector and the failure of the Royal Group to develop required infrastructure. No funding solutions were presented that could remedy the current situation, however the creation of the new national park may release national funds that could be directed towards issues such as these.

Rubbish disposal is also a significant problem within the study area. There is a lack of garbage disposal options available to residents, who either are forced to pay for the transport of trash back to the mainland or burn their trash (personal observation, 2017). Solutions were said to be difficult to find by respondents due to the wealth levels of many communities (B, N & O). One NGO is initiating program to tackle recycling on the islands, by purchasing PET recycling plants to assist in the reduction of plastics on the islands.
4.7.2 Regional economy significance

Respondents explained that the islands are a key driver of the Preah Sihanouk province’s economy and the coastal town of Sihanoukville. While there is an expanding casino sector in Sihanoukville, it attracts mainly Chinese tourists (Khmer Times, 2017) with a large portion of western tourists only transiting thought the town (respondent H & I). These tourists travel to the islands to enjoy the beaches, relaxed atmosphere, mountains and the sea, not a heavily developed resort town (respondent H & I). The financial value of tourists crossing to the islands is also key to the survival of many ferry companies, hostels and travel services (respondent H).

Lastly, ecotourism is promoted under the new national park, however the definition of ‘eco-tourism’ is not yet defined (Vannak, 2018). This was most evident owing to the varying responses received from participants, some of whom stated that eco-tourism was simply tourism in a natural environment, surrounded by trees (respondent H). This juxtaposed by respondent N who said, ‘eco-tourism should strive to minimise its effects on the environment while simultaneously giving back to the local community’. Further development of the islands would also require permanent presence of health services e.g. doctor clinic to deal with tourist emergencies and local health issues (respondent M).

4.8 Education

This category represents 4 codes which are as follows: Educational levels (44), Fishing to tourism transition (10), SMART education (2). The most significant theme emerging from this category is educational levels and support within the study area.

Respondents indicated that regular awareness raising events took place (in local communities and towns outside of the MFMA) discussing sea turtle handling, laws and the zoning of the MFMA (K, L N). This was deemed to be a success by some (F, H & L), however education in areas such as environmental awareness and language is lacking with no uniform approach adopted.

Local NGO’s offer seminars and learning events to local school children and adults (respondent O), with engaging and meaningful activities being the main method of communication. These activities are subject to grants and funding from donors and are thus restricted in areas which
they can address. While these efforts may be limited, their impact is not to be underestimated as it can be significant (Alder, 1996). The significance of education efforts proved to be vital in gaining acceptance of marine restrictions as users responded positively to this new found knowledge and importantly for the managers of the GBR is much less costly than enforcement (Alder, 1996). However, a total abandonment of enforcement activities was not recommended as certain individuals will always disregard rules and regulations no matter the educational efforts (Alder, 1996).

Two youth leader programs were identified as having an association with the MFMA; Liger learning center, who provide high class education to promising students for tomorrow (http://www.ligeracademy.org/) and young eco-ambassadors Cambodia. These groups take students to the islands to learn about the marine environment and have been crucial in the development of fun and educational learning kits for school children on the islands. However, these organisations are both based in Phnom Penh, not Sihanoukville where a marine education gap exists in local high schools according to (respondents F & H). Efforts have been made by management to have marine education included into the regions curriculum, but progress is slow (respondent I).

4.8.1 Fishing to tourism transition

Respondents recognised that a majority of jobs will be related to tourism, now and into the future if current expansion continues (A & F). This has been seen in the village of Koh Touch where over 100 fishing vessels (Figure 20) used to homeport. However, due to increasing tourism approximately 20-30% of boats have been re-purposed for tourism related activities (respondent H). Diversifying into the tourism from fishery-based economies is not a unique situation to the area as it is occurring around the world due to fishing pressures and rising fuel costs (C.-L. Chen & Chang, 2017). According to respondents (H, J, L, M & O) transition policies and educational facilities are not yet present on the island with the exception of education though NGO’s.
As previously discussed SMART is the chosen software used to monitor patrolling efforts by management. This program has assisted in the successful creation of better patrolling routes and data collection. However, as explained by a respondent it does require some initial capacity building and training, which is ongoing within the fisheries community to ensure all members are aware of the program (respondent K). Efforts to train government officials are ongoing with the aim of developing national capacity and a team of experts to ensure correct use of the software. Capacity development on a national level could enable the system to be rolled out nationally in other parks and future MFMA’s.

**4.9 MFMA planning and structure**

This category represents codes that share relations to MFMA planning and structure aspects, they are listed in order of frequency as follows: Revised management plan need (33), Structured management plan in use (29), Zoning (9)

Respondents indicated that a revised management plan is needed that considers the recent changes and challenges occurring on the islands (J & M). Tourism development, livelihood concerns, waste issues and new monitoring realities are all emerging issues that require attention in the rapidly developing area. The scope of management objectives and goals was also given some thought by respondents (C & M) as they felt there was a lack of short term
goals that could prove the worth of the MFMA to the local community and that success is being achieved.

Positively, a large number of respondents were very pleased with the current management plan and its structure while agreeing it could be updated to reflect the new realities (C, E, H, I & L). The activities and objectives of the management plan address the multifaceted nature of the area while attempting to provide a solution to the many conflicting interests and users in the area (Personal observation, 2017). Structured roles of committees and their members are defined in the management plan to ensure an efficient decision-making tree, ranging from local government through to national level management. However, new groups and individual stakeholders could benefit from having defined responsibilities within the MFMA to assist in their own planning and management.

4.9.1 Zoning

This aspect of planning was deemed to be highly successful by respondents and emerged as a positive theme for management. Respondent C explained:

“The zoning process took a long time as they took the time to speak to each of the stakeholders to get an idea of their opinions and what dive site they thought was important... That’s not easy to do and it takes a long time”.

The six zones as previously described are crucial to maintaining a sustainable fishery, while allowing for recreational tourist activities and small-scale fishing (Figure 2). These zones restrict movement through key areas for spawning and set aside areas for fish refugia to provide safety from nearby fishing. Proving refugia to fish species is the main purpose of many MPAs in the hope that fisheries will replenish themselves and provide ‘spill over’ benefits to nearby commercial or small scale fishery (T. Agardy et al., 2011; Di Lorenzo, Claudet, & Guidetti, 2016; Stobart et al., 2009). It remains unclear if this zoning plan will remain in place under the new national marine park.
5.0 Discussion

The central research questions of this thesis were:

1. What is the perceived current state of the MFMA?
2. What areas of management are in need of improvement according to the interviewed stakeholders?

This research has brought forward views, opinions and experiences of relevant stakeholders in an independent and unbiased manner. Many emergent themes have been presented in chapter 4, with each contributing to the development of theories that explain the current state of the MFMA. This section will discuss the major findings of this research and provide answers for the research questions, supported by literature identified in chapter 2. Insights and recommendations are derived from respondent answers as seen through the eyes of the researcher.

5.1 Acknowledgement of prior work

Firstly, the researcher wishes to acknowledge the work of all local, provincial and national government agencies who have been at the forefront of this initiative. The NGO’s involved have provided crucial guidance that assisted the successful designation and implementation of the MFMA. This managed area is the first of its kind in Cambodia and signifies a positive step in the way of sustainable ocean management, livelihood improvement and conservation. Many challenges were faced by management to obtain final approval, with the process taking over six years (respondent I). The researcher notes the inclusive nature of all planning and stakeholder activities where the opinions and interests of relevant parties were heard.

Significant headway has been made to ensure that management starts from the ‘bottom up’ empowering local communities to take charge of their environment. This approach of management is known for being more suited to developing nations where central management may not be financially possible or where a national agency may lack appreciation of local issues (Hind et al., 2010). It is key that these local stakeholders are consulted at all stages, now and
into the future for the MFMA to remain successful, as a failure to do so may result in resident revolt as seen in the Balicasag island MPA (Christie, 2004).

5.2 Immediate concerns
Talks between the former managers and the MOE are rumoured to be ongoing, however confusion resulting from this transition has a very real potential to impact the short and medium-term success of the national park. For example, Illegal fishers could take advantage of the confusion and quickly undo any conservation success in the absence of any patrolling teams. Alternately, progress could be quickly made in terms of sustainable funding mechanisms and the development of sustainable island building codes due to higher level of government influence afforded by the MOE. However, stakeholders interviewed for this research were concerned about the declaration and what it will mean for the local community. Literature identified in chapter 2 shows that decisions made now have the potential to ostracise local communities (Christie, 2004). Thus, decisions made regarding management changes and the handover of power should be made with great care as the ramifications may be long lasting and irreversible if community support is lost, especially in such a traditional society. It also remains to be seen how the community will react to the new national park and any new regulations.

The potential for prior research conducted by the fisheries administration and associated NGOs’ to become irrelevant and disused is real and needs to be addressed immediately. A national protocol for the sampling and monitoring of coral reefs is already in place, (Thorne et al., 2015) in addition to a detailed zoning plan consisting of 6 management areas. It remains unclear if the MOE will follow this sampling protocol, which is supported by up to six years of data. The same can be said for the current zoning of the MFMA, as the MOE is required to manage protected areas under the 2008 Royal decree with a 4-zone management approach. As this is the first MFMA and Marine National park it is expected that considerable negotiations will take place during the transition period, however care should be taken to involve all relevant stakeholders in these negotiations.
5.3 Communication with the tourism sector

Secondary to the concerns of the national park declaration, is the inadequate level of communication with new stakeholders, as identified by this research. New stakeholder communication and engagement has been lacking due to numerous reasons such as the rapid expansion of the tourism industry, fishery officer’s inability to communicate in English and an absence of any meaningful awareness raising campaigns. This lack of awareness should be a priority to the new managers of the area as major opportunities for sustainable financing are being missed, causing the area to operate on a less than ideal budget.

This lack of awareness provides a potential opportunity to engage new stakeholders, who may have new and innovative ideas that could contribute to future management schemes that may come forth during the transition process. These ideas and opinions could be gathered through knowledge and perception surveys (with the assistance of NGOs) conducted by the MOE to garner support for area, which would then form the basis of an engagement strategy (Pomeroy & Douvere, 2008). It is also key to gain an understanding of the attitudes and perceptions of these new stakeholders to aid the social cohesion of the MFMA moving forward (Figure 21).

![Diagram](Image)

*Figure 21- Example of a general framework to inform stakeholder engagement strategies. Source: (Dovers et al., 2015).*
This engagement strategy, as identified by respondents should focus on identifying key stakeholders who are willing to participate in MFMA activities (e.g. demarcation) or fund raising. These stakeholders could be linked up with existing partners who already play an active part in the MFMA to encourage data sharing and promote the common marine conservation goals of the area.

Furthermore, as the new tourism-related stakeholders represent a sizable portion of the businesses on the islands, an opportunity to advertise the MFMA and the benefits to tourists exists. Many of these new businesses are hostels, hotels or transport providers which could advertise the conservation efforts through media such as: posters and painting. Additionally, there is also room for voluntary donations to be gathered, especially as the WTP surveys identified that tourists are willing to pay for conservation efforts (J. Hastings et al., 2015). The success of the voluntary donations would be reliant on the efforts of those involved in ‘selling’ the need for conservation and livelihood improvement with the islands. These donations may be favourable over a small tax on businesses as they have the option to opt out if they feel MFMA does not meet their expectations (Nabangchang-Srisawalak et al., 2016).

5.4 Sustainable financing

Securing sustainable funding for the study area as identified by this research should also be key for the new managers as it is affecting the areas ability to function as intended. Conventional and un-conventional ways of funding are worthy of investigated by the MOE which may include: corporate funding, user entry fees, PES, donation box utilisation and the sale of arts and crafts. The MOE may find much more success in this area then when compared to the fisheries administration as they have power to make changes on land and are not restricted to marine environments as the fisheries administration was. This additional power may for example allow the MOE to place donation boxes at higher frequented areas. However, it is again crucial that the local community and stakeholders be consulted throughout the entirety of the decision making process (Pound, 2009). The researcher notes that it will be difficult to raise awareness of the area to tourists and businesses who serve them without funding, yet paradoxically they could also provide the funds that the area lacks.
Entry fees should once again be revisited by the MOE as it may have the ability to adequately fund the national parks required expenditure (Baral et al., 2008; Thur, 2010). Significant resistance is to be expected from the provincial government on this front due to the already installed $2 ferry fee, however literature identified in this research has shown that funds can be shared with the involvement of numerous government agencies (e.g. Galapagos islands).

Commercial sponsorship or corporate funding would also be worthy of investigation as this research has shown that major companies throughout the world (e.g. Air New Zealand) are willing to invest in conservation efforts as their clients begin to demand a more socially responsible company (Emerton et al., 2006; Tai & Chuang, 2014). While major sponsorship deals for conservation may not be present in a Cambodian context, the potential to gather funds through commercial partners is real if transparent mechanisms are put in place. Companies which offer their services to middle class Cambodians and westerners such as tourist agencies, private bus companies and various food brands could potentially provide sponsorship. This may require the development of a MFMA ‘brand’ or logo, recognisable to the general public over which companies could make donations to have located on their product (Geoghegan, 1998).

5.5 Long term stakeholder engagement
Communication with long term existing partners was deemed to be good by management, with this assessment proving true throughout the course of this research where stakeholders found communication to be as they had hoped for, leaving them to feel involved and valued (respondents A, C, E, F & I). However, while these stakeholders are engaged, their efforts seemingly lack any coordination with other NGOs or groups who are trying to achieve the same goals. For example, two NGOs located within the study area are currently undertaking coral nursery programs that ultimately share the same goal of restoring lost habitat. If these NGOs were to share simple scientific information with each other and coordinate their efforts, mutual trust and comradery could be built to the benefit of the national park.

The dive sector has showed itself as being engaged throughout this research within the study area. They played a key role in the planning and identification of key habitats and biodiversity hotspots which formed the basis of the zoning scheme. In addition, citizen science monitoring programs are being developed with the aid of these organisations. However, during the
researcher’s visits to these diving shops, not once did he see information regarding the MFMA displayed in public areas. Reasons as to why the dive sector is not actively supporting and promoting the MFMA, especially to tourists remains concerningly un-answered. Furthermore, dive shops have the potential to be key information centres for tourists providing them educational seminars and the like, while also offering divers the opportunity to give back to the community though monetary donations or donations of their time to assist with citizen science projects. The dive sector has perhaps the most to gain from a flourishing reef habitat, yet they also have the most to lose if the MFMA fails to conserve the area.

The use of the SMART monitoring system is also another major positive for this area, as it allows for the analysis of patrol routes for future improvement. It also provides a simple and teachable platform that can be utilised by all patrol members in the MFMA and in the short to medium term, the rest of Cambodia. The use of this system should be continued after the transition period to ensure for data continuity, as recommended by respondents.

Local fishermen and communities were reported to be aware of the laws and regulations regarding the current MFMA according to many interview participants. The introduction of the new national park as previously discussed will create uncertainty regarding these laws and the effects it will have on the local fishermen. It is crucial that these fishermen are consulted with any proposed changes to local fishing laws to ensure their continued understanding and support (Christie, 2004). Further to this point, due to the unclear nature of the proposed national park it is imperative that the goals and objective of the area be defined as soon as possible. A broad goal for the area obtained by a local newspaper which stated its purpose to be to “protect the natural resources and biodiversity of the islands, while promoting ecotourism initiatives with a small ecological footprint” (Vannak, 2018). It is imperative that new management defines this statement to provide clarity moving forward. Concerns regarding the existing management structure, livelihoods improvement strategies and tourism development should be addressed.

5.6 Tourism transition
The level of support given to fishermen who may want to make the transition to tourism is very low. For these transitions to occur successfully, and if lessons from around the world are to be followed, policy or plans need to be made to assist with this transition (C.-L. Chen & Chang,
Skills such as: restaurant management, budget planning, cash handling, language training could benefit the local community. Building the capacity of these establishments may lead to increase livelihoods and aid the transition to a tourism-based economy on the islands (C.-L. Chen & Chang, 2017). Planning of these policies needs to occur carefully as to not offend or disrespect local customs. These policies may not be currently in place due to restrictive funding and priorities of management.

5.6 Public release of documents
The public availability of key management documents, such as: budgets, management plans and research reports are imperative to maintaining faith and transparency in projects such as the MFMA. None of these documents are easily publicly available, which was raised by several respondents (A, C, E, N& O) and is something which should be investigated. It would allow documents to be publicly shared with stakeholders and interested parties. Incidentally, this may also raise the profile of the MFMA internationally as projects in need of assistance could be advertised here. Within Cambodia, Marine Conservation Cambodia has created a website with most of their documents freely available for download, while also offering a place for scientists and volunteers to directly contact management (www.marineconservationcambodia.org).

5.7 Education
Currently, education outreach programs seem to be limited to the Liger learning and Eco-ambassadors. Schools in Sihanoukville appear to have been mostly missed in coastal education by management, with no regular studies on marine environmental issues being part of the curriculum (respondent F& I). Raising the awareness of the youth in Sihanoukville could have benefits towards overall marine conservation in Cambodia and the MFMA. School trips to the islands could be organised, funded and planned by management to increase local awareness of the marine environment.

5.8 Additional issues
The majority of patrols occur during daylight hours, when illegal activities are at their lowest (Flora and Fauna International, 2017). Additionally, CFIs are in need of new boats, engines and safety equipment to better patrol their areas and attract more patrol members (I, J, K, M & O).
Without these upgrades it is likely that patrolling will remain inefficient while also becoming more difficult and less frequent as equipment ages and deteriorates. Additionally, there is a potential for fishery stock replenishment to occur because of the implementation of the above-mentioned strategies. Thus, the area may become more attractive to IUU fishing, influencing the success of the area (Di Franco et al., 2016; Edgar et al., 2014). These problems will not resolve themselves with time alone additional funding is required to improve the current situation.

Waste disposal within the islands is another critical issue that has increased in scope with rapid tourism development. Businesses and residents must pay for their rubbish to be removed via the local transport boat. This fee cannot be afforded by many of the poorer residents and result in a daily burning of rubbish. Solutions need to be brought forward by the new management authority if the island is to maintain the appearance of being a ‘unspoilt hideaway’. Sewage treatment is also another major problem within the study area with many businesses running their waste directly into the ocean (Respondent H &I). The village of Prek Svay has installed septic tanks and employs vulnerable women to collect rubbish with funding coming from a nearby resort. At this time, raw sewage is often released straight into the ocean presenting a public health hazard to swimmers and locals alike.

Sedimentation issues may also become more prevalent if land clearing continues to occur at its current rates. Lessons are to be learnt from Australia’s experience with the creation of the Great Barrier Reef Marine Park where sedimentation has proved to be very hard to control due to clearing and farming activities. Significant additional government expenditure has been required to reduce the ongoing impact of sedimentation (Australian Government, 2015). Finally, it has been difficult for the current management to enact change over the islands waste and sedimentation problems as they do not have the right to govern over land. The new marine national park will give powers to the ministry in charge allowing them to make changes on land. With these new-found powers, consultation should occur to assess what the local population thinks are the best solutions for their waste problems and subsequent policy should enact these suggestions, if they are feasible and based on science.
5.9 Identified theories and broader management implications

Grounded theory as previously discussed is an inductive and comparative method that provides guidelines for all stages of qualitative data research with the aim of theory construction (Charmaz, 2014). This research has identified 41 open codes, 8 axial codes and 2 core categories (insufficient funding & collaboration and communication). These two categories were crucial in aiding the construction of the emerging theories from this research. The main finding or ‘theories’ from this research offers an explanation about the many concerns identified throughout the interviews, personal observations and reflections. These theories are: (1) The Koh Rong archipelago is in a state of flux (2) Insufficient funding is causing the MPA to operate less than efficiently (3) Communication and collaboration with new stakeholders is poor, with many opportunities being missed (4) A lack of transitional assistance may be hindering moves towards tourism from the fishery sector (5) Paradoxically, those who visit the area may have funds to solve the financing problems, yet most are unaware even of the existence of the MPA. These findings concur with global issues facing many MPAs, especially in terms of lacking finances which is a problem faced by many developed world MPAs let alone developing countries areas. Effective communication with stakeholders has also been identified as key to the success of MPAs on a global scale (Pomeroy & Douvere, 2008) and is something that the new managers need to focus on in earnest.

This thesis was intended to be ‘applied’ and provide real solutions to current problems faced by management. It does however have broader management implications and theoretical value. Firstly, it has identified in a South East Asian and Cambodian context that MPA management is subject to abrupt management changes, insufficient funding and communication & collaboration problems. Secondly, these findings contribute to Cambodian MPA management literature as the first independent research. Thirdly, the use of grounded theory as the research method for this thesis brings an original approach to MPA investigations of which the researcher could find few previous examples of, certainty within the South-east Asian region.
6.0 Conclusion and management recommendations

This research has presented a broad range of opinions, experiences and suggestions from a cross section of relevant stakeholders involved with the MFMA. Using grounded theory as its research method it has taken a unique and original approach to MPA investigation, providing 5 main findings that may add to Cambodian MPA literature. Highlighted in this study is that the area is in a state of flux and decisions made in the near future will affect the long-term feasibility of the project within the Koh Rong Archipelago. The following recommendations are given with the aim of improving management of the MPA, they are based on MPA related literature and original research which this research has conducted. They are ranked from 1 to 7 with the most likely to be implemented and find success in the researcher’s opinion appearing first.

(1) Tourist awareness of the MFMA is almost non-existent with little to no advertising material in highly trafficked areas within the study site. Raising the awareness of this group should also be a key priority of the new management regime as they have the potential to provide solutions to the chronic underfunding facing the area. For awareness to be raised efficiently any advertisement would need to take place at various tourist ‘choke points’ such as the speed ferries (J. Hastings & Yeang, 2014). Several options could be considered including information centres at wharfs, information pamphlets available to tourists when purchasing speed boats tickets or information boards at various hotels and hostels within Sihanoukville and the islands. The option of utilising the 40-minute ferry ride to the Archipelago to present an educational documentary is deemed to be the most likely to succeed in raising awareness with tourists because of a lack of other stimuli on the ferries. Educational videos have recently been suggested to statistically reduce the amount of damage caused by scuba divers to the benthos then when compared to those who were not shown the video (Giglio, Luiz, Chadwick, & Ferreira, 2017). If this same principal is applied to the MFMA, perhaps tourists would for one, think about their impact on the environment during their stay and consider donating to the MFMA more than if they were not made aware of the issues facing the islands.
This educational video could take the form of a short documentary to maximise the 40-minute window which the ferries give. Technical aspects will need to be coordinated by management, however a story of the MFMAs progression which details its benefits to the local community and environment could be presented. The current donation goal could be stated, and other areas of need highlighted to the viewer before finally asking for donations at one of the donation points located on the islands. To cover the costs of production, funding could be sought from commercial partners in exchange for advertising after the video has finished or endorsement of their product through the video. For this to become a reality, TV’s must be installed on each capable ferry boat. Funding for these TV’s could again come from potential commercial partners who wish to promote their brand (Geoghegan, 1998).

(2) Recognition of past efforts, agreements and understandings from the new management authority is recommended as many years of work have already been put in to enable the proclamation the MFMA. However, it is entirely possible the MOE may wish to assume full control of the area and conduct their own assessments with the potential of alienating local communities. For the sake of the residents and the many NGOs invested in the area, the motivations of the MOE and the goals for new National marine park should be made clear as soon as possible.

(3) The Koh Rong archipelago is experiencing unprecedented growth in the tourism sector. As this research has identified, this rapid growth has resulted in a lack of awareness amongst tourism operators. This lack of awareness should be immediately attended to by the form of an awareness campaign and the creation of a new stakeholder engagement plan by management. Each business should be consulted to gain an understanding of their opinions and experiences while simultaneous gauging their interest in being involved with MFMA activities such as fundraising and conservation efforts.

(4) The need for the creation of a MFMA or national marine park specific website is another key finding from this research. Management could benefit from increased transparency
and as recommended by Dovery (2008), management accountability is crucial in developing nations. It was unclear to the researcher if key documents such as budgets, management goals and monitoring reports were publicly available for scrutiny. Allowing members of the public to access these documents, may increase the trust between stakeholders and institutions managing the area while also widening communication channels. This is a key recommendation by Pomeroy (2008) to increase transparency and keep management accountable for their actions.

(5) Furthermore, if the MFMA reaches its stated conservation goals (Annex 4) it may become a highly attractive fishing ground for IUU fishing as a result of increased fish stocks. To account for this, it is recommended that an increase in patrolling efforts occurs, especially during the night to counter the presence of potentially increasing IUU fishing. This will require more funding to be given to CFIs for fuel and wages. Enforcement is recognised as being key to the success of marine managed areas, thus it is crucial that management closely watches for any increases in illegal activities through the SMART monitoring system and adjust patrol levels accordingly (Edgar et al., 2014).

(6) Increase the support given to local villages who wish to make the transition from fishing related employment to tourism. As reported by Vibol (2011), less than 50% of villagers in the main tourist town of Koh Touch have a basic understanding of English which may be impeding their ability to take advantage of the increasing tourism trade. Support could be given by way of English lessons, business education and basic hospitality courses. Local fishermen who wish to remain in their industry should not be forced out, rather made aware of the opportunities tourism can present to them e.g. recreational fishing or snorkelling tours. This approach has proved to be successful in traditional Taiwanese fishing communities where government policy assisted to the gradual transition to a tourism based economy (C.-L. Chen & Chang, 2017).

(7) Additionally, educational efforts for marine issues within local schools with the Archipelago and the greater Sihanouk province are very poor. This should also be attended to, as children will be the makers of change within the community and
represent the future of the Archipelago. Coordination to raise awareness of these issues should occur between locally capable NGOs, public and private educational providers as well as government. Acknowledgement should be given to the efforts being made by some, however there is much to be done.
7.0 References


Chea Phalin. (2014). Assessment of CFi committee perceptions and involvement in local fisheries management, Koh Rong Archipelago Retrieved from Phnom Penh:


80


Annex 1

Interview guide example

How long have you been involved with the MFMA?

How would you describe the current situation of the MFMA?

Could you describe some activities that you were involved with and why you think they were successful or not?

What do you think are the main purposes of the MFMA?

Can you explain what you think are some of MFMA's strengths?

What areas do you think need improvement?

Are you aware of educational efforts on the Islands and on the mainland? What are your opinions on its current state?

How would you describe efforts to reduce illegal fishing in the MFMA?

What are your main concerns that you having the potential to stop the MFMA from reaching its goals and objectives?

What are your views on the further development of the islands?

In 5 years’ time, where do you think the MFMA will be?

Do you have any further ideas or experiences regarding the MFMA that you would like to share with me?
Annex 2

This annex displays all categories and their associated codes (frequency of code is indicated).

<table>
<thead>
<tr>
<th>Education level (44)</th>
<th>Enforcement Regulating and patrolling IUU (56)</th>
<th>Governance Transparent decision making (28)</th>
<th>Island development Sustainable development concerns (38)</th>
<th>MFMA awareness Awareness issues (23)</th>
<th>MFMA planning and structure Recalibration of management plan (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing to tourism transition (10)</td>
<td>Demarcation need (9) National park increased powers and risks (12)</td>
<td>Terrestrial pollution and waste management (16)</td>
<td>Law and regulation awareness (11)</td>
<td>Structured management plan in use (29)</td>
<td></td>
</tr>
<tr>
<td>SMART training (2)</td>
<td>MFMA size (4) Research permission (4) Regional economy significance (5)</td>
<td>Multipurpose MFMA definition (9)</td>
<td>Comprehensive and successful zoning process (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMART system (3) Disappointment with CFI (3) Eco-tourism potential (5)</td>
<td>Conservation first MFMA definition (4)</td>
<td>Defined network of committees and government agencies (8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conservation and development balance (3) Critical infrastructure needs (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 3

Approval for the research from the Ministry of Agriculture, forestry and fisheries

A final summarised report of this thesis will be provided to the fisheries administration.
Annex 4

KRA-MFMA Goals and Objectives (Ministry of Agriculture, 2016)

Biophysical:

Goal 1: Marine fisheries resources sustained

Objective 1A: Population of target indicator species for extractive or non-extractive use restored to or maintained at desired reference points

Objective 1B: Populations of target species for extractive and non-extractive use protected from harvest in MFMA areas and/or life history stages where they become vulnerable

Objective 1C: Over-exploitation of marine resources minimized, prevented or prohibited entirely in the MFMA

Objective 1D: Catch yields improved or sustained in fishing areas adjacent to Conservation Areas and Fisheries Refugia

Goal 2: Ecosystem biodiversity and function protected and restored

Objective 2A: Key habitats protected, restored and maintained

Objective 2B: Rare species protected

Objective 2C: Indigenous marine faunal biodiversity maintained or increased

Objective 2D: Anthropogenic impacts eliminated or minimized inside and/or outside the MFMA

Socioeconomic:

Goal 1: Food security enhanced or maintained

Objective 1A: Ensure households have enough food throughout the year

Objective 1B: Households have enough seafood for home consumption

Goal 2: Livelihoods enhanced and diversified

Objective 2A: Total household income is maintained or increased
Objective 2B: Range of livelihood activities diversified

Objective 2C: Relative importance/proportion of income from tourism increased

Objective 2D: Traditional family fishing practices maintained

Goal 3: Benefits from MFMA equitably distributed

Objective 3A: Food security, income and livelihoods benefits are felt by all members of the community

Objective 3B: Poorer and traditionally marginalized members of the community are adequately represented in governance/decision-making structures & processes

Goal 4: Enhance environmental awareness & knowledge

Objective 4A: Increased local knowledge on the impact of waste

Objective 4B: Improved understanding of marine biological processes and MFMA impacts

Objective 4C: Improved understanding of by-laws for CFi and MFMA

Objective 4D: Public’s understanding of environmental and social ‘sustainability’ improved

Governance:

Goal 1: Effective legal and management structures and strategies maintained and created

Objective 1A: Rules for resource use and access clearly defined and enforceable

Objective 1B: Maximise compatibility between national, provincial and local (CFi) arrangements

Objective 1C: Ensure periodic monitoring, evaluation and effective adaptation of management plan

Objective 1D: Human and financial resources sufficient and used efficiently and effectively

Objective 1E: Adequate legislation exists and is compatible with international, national and local rights

Objective 1F: Create financial sustainability for the MFMA
Goal 2: To ensure effective stakeholder participation and representation through co-management

Objective 2.A: Ensure representativeness, equity, and efficacy of collaborative management systems

Objective 2.B: Build CFi membership capacity effectively in order to be able to participate in management

Goal 3: Resource user compliance to MFMA regulations enhanced

Objective 3.A: Participatory surveillance and monitoring of MFMA improved

Objective 3.B: Local and national laws and regulations are adequately applied and enforced

Objective 3.C: Management plans are simple and accessible