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**INCLUSION OF LOCAL ECOLOGICAL KNOWLEDGE WITHIN  
MARINE PROTECTED AREAS IN THE PACIFIC ISLAND REGION**

**A THESIS SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE**

**OF**

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## **ABSTRACT**

Global biodiversity loss and climate change are threatening the survival of marine ecosystems and the Local Ecological Knowledge (LEK) that is inextricably tied to them. Marine Protected Areas (MPAs) are increasingly used worldwide to conserve marine ecosystems and support ecosystem services and cultural values. MPAs are a typically top-down marine management model with the primary aim of biodiversity conservation. The international community and researchers have increasingly recognised the critical importance of including LEK, local communities and Indigenous peoples within MPA decision-making, governance, and management. Despite this, there is a lack of empirical research on the involvement of Indigenous peoples within MPA management and governance. This study addresses this research gap by focusing on how LEK has been included within MPA management in the Pacific Island region. A reflexive thematic analysis is used to examine four publically accessible regional frameworks and action plans pertaining to the management of MPAs in the South Pacific.

The results reveal that the inclusion of LEK has been moderately successful within the Pacific Island region through the identification of three themes: i) LEK, livelihoods and biodiversity conservation are interconnected and essential elements within MPAs, ii) LEK is a tool that allows communities to have and regain influence over use of resources through MPA management and governance, and iii) misalignment between regional and international level inclusion of LEK within MPA management. On reflection of these findings, their implications, and how they are situated within the literature, four conclusions and recommendations have been made. First, the focus needs to shift from LEK to LEK holders for meaningful and impactful research on the inclusion of Indigenous peoples and local communities within systematic conservation management. Second, the Pacific Island region needs to improve horizontal alignment across MPA frameworks and actions plans, particularly when stating where regional efforts feed into on the international level. Third, the Pacific Island region should challenge the international community's weak inclusion of LEK holders within global MPA targets and MPA global standards. Finally, the international community needs to identify the inclusion of LEK and LEK holders as a cross-sectoral objective within all targets and global standards pertaining to MPAs. These amendments will be critical for advancing effective and appropriate MPA management, and empowering and recognising Indigenous rights.

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# 1. INTRODUCTION

## 1.1 Background

Biodiversity within marine ecosystems is decreasing at an alarming rate (IBPES, 2019). At the same time, local, traditional and Indigenous knowledge, particularly the knowledge pertaining to marine species, habitats and ecological functioning, is shadowing biodiversity loss (Aswani et al., 2018; Gilchrist et al., 2005; Davis & Wagner, 2003; IUCN, 2020b). Local Ecological Knowledge (LEK) is a knowledge system that refers to various cultural practices, values, understandings and beliefs that have been developed over long periods of time by local, traditional, and Indigenous communities (Aswani et al., 2018; Davis & Wagner, 2003). This knowledge system is dynamic and evolves with location-specific social and ecological changes (Aswani et al., 2018). With environmental issues such as the climate crisis currently having devastating impacts on marine environments that are expected to increase in severity in the coming decades, it is crucial that marine biodiversity and LEK are safeguarded through effective marine management (IPCC, 2014).

There are several existing approaches to marine management including many have been in existence for millennia and are comprised of traditional and Indigenous customs and practices (Govan et al, 2009a; Veitayaki et al., 2004). Marine Protected Areas (MPAs) are a marine management model that has been increasingly embraced as a tool for safeguarding marine ecosystems around the world (Lubchenco & Grorud-Colvert, 2015). There are various marine management approaches that achieve MPA status, however the International Union for Conservation of Nature (IUCN) states that conservation of nature must be the primary objective for a marine managed area to



qualify as a MPA (Day et al., 2019). This requirement excludes traditional marine management areas and Indigenous and community conserved areas (ICCAs) that prioritise multiple objectives such as sustainable resource use, supporting cultural values, supporting ecosystem services and biodiversity conservation (*ibid.*).

Over the past two decades there has been a surge in MPA establishment to address and mitigate the biodiversity crisis and climate change (Lubchenco & Grorud-Colvert, 2015; IBPES, 2019). This surge has been partly attributed to many countries around the world signing agreements to achieve global targets of 10% MPA coverage by 2020 that were established under the Convention on Biological Diversity's Aichi Biodiversity Targets, and also the United Nations Sustainable Development Goals (SDGs) (Sustainable Development Knowledge Platform, 2019; CBD et al., 2010; Marine Conservation Institute, 2020; Lubchenco & Grorud-Colvert, 2015). A further 2030 goal of 30% MPA coverage has been recommended by the International Union for Conservation of Nature (IUCN) World Conservation Congress, indicating that MPA establishment is likely to continue in the coming decade (MPA News, 2016; Lubchenco & Grorud-Colvert, 2015).

The IUCN has also stated that immense tasks need to be undertaken in order for MPAs to be considered effective and well managed (IUCN, 2020a; IUCN 2020b). One such task is appropriate management which incorporates LEK, local communities and Indigenous Peoples into MPA decision-making, planning, monitoring and maintenance (IUCN 2020b). There has been increasing recognition of the value and importance of including LEK, local communities and Indigenous peoples within natural resource management and conservation (Ban et al., 2011; Hepi et al., 2018; IUCN, 2020b,

IPBES, 2019). Including LEK and LEK holders within marine conservation has many benefits, including an increased success rate of the conservation programmes within the Pacific Island region, and also greater cost-effectiveness of conservation programmes. Inclusion of LEK holders also corresponds with more successful integration of traditional and local knowledge into marine conservation decision-making processes (Tawake et al., 2001; Veitayaki et al., 2004; Danielsen et al., 2014; Waylen et al., 2010).

Last year, the international community called for the matter of the effective inclusion of Indigenous groups to be addressed at the highest level of environmental governance (United Nations Environmental Programme, 2019b; United Nations Environmental Programme, 2019a). Despite this, the effective inclusion of LEK and LEK holders within MPA governance and management has received little attention in research. Less than 0.5% of all research publications pertaining to MPAs have examined the involvement of Indigenous peoples in MPA decision-making and governance (Ban et al., 2018).

Over the last decade, the Pacific Island region has championed global ocean protection (Quirk & Hanich, 2016). The Pacific Island region advocated for a single goal pertaining to ocean and marine life to be included within the SDGs (SDG 14: Life Under Water) and has established several MPAs and MPA networks over the last decade (Quirk & Hanich, 2016; Marine Conservation Institute, 2020). In addition, the region has developed the Locally Managed Marine Area (LMMA) Network, a bottom-up model of marine conservation that is now being replicated in many other parts of the world (Veitayaki et al., 2004; Govan & Jupiter, 2013). The Pacific Island region is

uniquely placed within ocean management in the sense that the majority of countries and territories are governed by Indigenous people, and traditional tenure and governance is prevalent (Govan et al., 2009). The region is diverse in cultural systems and ecology with over one thousand different ethnic groups and cultures, and near-pristine marine ecosystems that are abundant (*ibid.*). Marine ecosystems and people living in the Pacific Island region are extremely vulnerable to the impacts of climate change; coral reef ecosystems are expected to perish in increasing sea surface temperatures, and many low-lying island nations are vulnerable to the increased incidence of severe storms and sea level rise (Govan et al., 2009; Gattuso et al., 2014; IPCC, 2018). Many Pacific communities must deal with the impacts of climate change in the present day (*ibid.*).

The lives and futures of all Pacific Islanders are inextricably linked to marine ecosystems and it is crucial that MPAs within the region are effectively governed and managed so that livelihoods and marine biodiversity are resilient in the wake of global environment issues such as biodiversity loss and climate change (Govan et al., 2009). With sparse research on the involvement of Indigenous peoples within MPA governance and management, there is a lack of empirical research on the involvement of Indigenous peoples and local communities within regional level MPA management in the South Pacific (Ban et al., 2018; Ban et al., 2011). This study aims to address this research gap by examining the inclusion of LEK within MPAs in the Pacific Island region.

## 1.2 Problem Statement

Effective and appropriate inclusion of LEK and local and Indigenous communities within MPAs has been called for by the international community to better existing MPA management systems. While it is important that effective MPA management is adopted within the Pacific Island region to build resilience to climate change and mitigate biodiversity loss, research has not examined how LEK has been included within regional MPA management. This research will address that research gap by examining how LEK has been included within regional MPA management.

## 1.3 Aim

The aim of this research is to examine how LEK has been included within MPA management in the Pacific Island region.

## 1.4 Objectives

The objectives for this research are:

- i) To identify how LEK has been described within MPA management in the Pacific Island region.
- ii) To identify if LEK enables Indigenous Peoples and local communities to meaningfully participate in MPA management in the Pacific Island region.

iii) To identify if the inclusion of LEK within MPA management assists the Pacific Island region in meeting global MPA targets.

## 1.5 Research approach

The research employs a reflexive thematic analysis approach that adopts a six-step procedure outlined by Braun and Clarke (2006) and involves a fully qualitative examination of secondary data. The dataset is drawn from four publicly accessible regional frameworks and action plans for MPAs in the Pacific Island region.

## 1.6 Thesis outline

This thesis contains seven chapters. Chapter one introduces the research aims and objectives and provides a statement and outline of the problem being researched. It also introduces the research topic and identifies the research gap which this study aims to address.

Chapter two will focus on the current state of the biodiversity crisis and what approaches exist to mitigate marine biodiversity loss and the impacts of anthropogenic climate change, as well as on literature on the global MPA movement. It will also critically respond to literature and research on local and Indigenous knowledge systems, and the power dynamics surrounding the incorporation of local and Indigenous communities within systematic conservation planning.

Chapter three will present background information on the Pacific Island region, the chosen study area for this research project. It will provide contextual information about the ecological, social, cultural and political environments within the region.

Chapter four will describe the research approach for this study and will explain in detail why it is the most appropriate method to address the research aim and objectives, based on its use within similar research included in the literature review. It will also reflect on the limitations of the research approach and provide detailed information on the data collection and procedure.

Chapter five will present a summary of the results drawn from an examination of how LEK has been included within regional frameworks and action plans pertaining to MPAs within the Pacific Island region.

Chapter six will present a discussion of the research results. This will include the implications of the results, the researcher's critical reflections, and how the results are situated within the existing research.

Chapter seven will present the conclusions of this research project and recommendations arising from it. These relate to shifting the focus from LEK to LEK holders for more impactful and meaningful representation and research within MPA management. They identify a weaker level of inclusion of LEK within global targets and standards for MPAs, which currently stands as a barrier for regional efforts to strongly include LEK and LEK holders within MPA management in the Pacific Island region.

## 2. LITERATURE REVIEW

### 2.1 Introduction

An unprecedented global decline in biodiversity is taking place, with many marine species and ecosystems expected to face extinction in the coming decades unless human induced pressures that are driving biodiversity loss are effectively addressed (IPBES, 2019). This degree of biodiversity loss is felt throughout society, threatening the foundations of economies, food security, and health, with impacts most severe for the regions, countries, and communities where quality of life and livelihoods are most directly dependent on ecosystem goods and services (*ibid.*).

In addition, Local Ecological Knowledge (LEK) pertaining to marine environments within many regions, countries, and communities is also threatened, and is tailgating the global decline in biodiversity (Aswani et al., 2018). LEK is an umbrella term that represents a diverse range of knowledge, beliefs, practices and values that are held by local, traditional, and Indigenous Peoples and communities (Gilchrist et al., 2005; Davis et al., 2003). LEK has been developed over long periods of time across many cultures and communities around the world and is a dynamic knowledge system that is evolving alongside social and environmental change (Aswani et al., 2018; Davis et al., 2003). Effective management of marine environments to safeguard biodiversity, LEK, and ecosystem goods and services for livelihoods is a critical global challenge that needs to be addressed with urgency.

This chapter will present the key concepts and developments from existing literature regarding marine management approaches around the world, and how LEK is situated within decision making, planning, governance and management of marine

ecosystems. This chapter will critically examine the global MPA movement which is fast-growing, popular, and a typically top-down approach to management. It will identify and discuss power dynamics and challenges that exist for local and Indigenous communities within systematic conservation management. This chapter will then discuss the opportunities and limitations presented through alternative approaches to marine management such as the Locally Managed Marine Area (LMMA) network, a bottom-up approach to marine management that has been contributing to MPA global targets within the Pacific Island region. It will then explain the Pacific Island region's role in leading the movement for global ocean management through successfully advocating for a single ocean goal within the Sustainable Development Goals (SDGs) and through commitment and implementation of several MPAs and LMMAs over the past decade (Quirk et al., 2016; Veitayaki et al., 2004, Marine Conservation Institute, 2020). Finally, this chapter will identify the research gap that this study directly responds to, which is examining the involvement of Indigenous and local communities within MPA management through the inclusion of LEK within MPA management in the Pacific Island region.

## 2.2 Marine Protected Areas: Objectives and establishment within the global ocean

MPA networks are groups of several ecologically connected MPAs recognised as a powerful tool for ocean conservation (McClanahan et al., 2006; Robb et al., 2015; Hermoso et al., 2016; Day et al., 2019; Oregon State University et al., 2019). The International Union for Conservation of Nature (IUCN) defines a MPA as:

A 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, p. 8)



Further unpacking of this definition in the best practice guidelines for MPAs revealed what constitutes conservation of nature and associated ecosystem services and cultural values (Dudley, 2008; Day et al., 2019). ‘Conservation of nature’ refers to the *in-situ* maintenance of biodiversity at a genetic, species, and ecosystem level (Dudley, 2008). ‘Associated ecosystem services’ are the provisioning, regulating, supporting, and ‘cultural services’ that ecosystems provide for people, and associated ‘cultural values’ refers to ecosystems that are recognised as sacred sites with significant cultural and heritage value (*ibid.*). A key component to this definition is that conservation of nature is the primary management objective for protected areas, and associated ecosystem services and cultural values are secondary management objectives (Dudley, 2008; Day et al., 2019). This means that marine managed areas that prioritise sustainable resource use and cultural values, but also incidentally contribute to biodiversity outcomes, are not necessarily counted as MPAs. For a marine managed area to qualify as an MPA, biodiversity conservation needs to be prioritised above marine resource use and cultural values, particularly in a situation where these objectives conflicted with each other. This key distinction for what constitutes a MPA is reflected in the following statement taken from the ICUN’s recently released supplementary guidelines for MPAs (Day et al. 2019):

The 2008 definition of a protected area stipulates that for a site to be a protected area priority must be given to nature conservation; other values present may be of similar importance, but in the event of conflict between values, nature conservation must be considered the most important. As is the case with other governance types, community areas managed primarily for sustainable extraction of marine products would not be considered protected areas according to the IUCN definition unless nature conservation is the primary stated objective of the management regime. (Day et al., 2019, p. 19)

Therefore, the aim of MPAs is to conserve biodiversity, and associated ecosystem services and cultural values are only considered when they do not interfere with biodiversity conservation outcomes (*ibid.*).

The establishment of MPAs and MPA networks involves a series of stages that are typically actioned through decisions made by formal authorities, such as ministerial bodies, local authorities, as well as organisations such as research institutes and private actors (Ban et al., 2011; Ban et al. 2018; Nursey-Bray & Rist, 2009; Borrini et al., 2013). The stages of establishment for a MPA ideally follow a process of being proposed, designated, implemented, and actively managed (Nursey-Bray & Rist, 2009; Day et al., 2019; Marine Conservation Institute, 2020). However, not all MPAs reach the final stages of being implemented or actively managed. Some barriers that have prevented implementation and active management of MPAs include a lack of human and financial resources (IUCN, 2020a; Lubchenco & Grorud-Colvert, 2015). Spatial disparity exacerbates these challenges, with around 80% of all MPAs located within the economic exclusive zones of just seven countries (*ibid.*).

Over the last two decades there has been a surge in the establishment of MPAs (Lubchenco & Grorud-Colvert, 2015). The total percentage global ocean surface covered by MPAs increased from 0.1% in 2000 to 5.3% in 2020 (Lubchenco et al., 2015; Marine Conservation Institute, 2020). The increase in MPA implementation over the past twenty years can be partly attributed to the international political response to critical concerns regarding marine biodiversity loss and the climate crisis (CBD, UNEP & Secretariat of the Convention on Biological Diversity, 2010; Sustainable Development Knowledge Platform, 2015). The Intergovernmental Panel on Climate Change (IPCC) has declared that MPAs are a critical tool for combating the global climate crisis and biodiversity loss within its IPCC Working Group II report on marine environments and climate change (Gattuso et al., 2014). This report further stated that MPAs and sustainable fisheries management have the potential to increase coral reef resilience to the impacts of climate change, particularly when MPAs are embedded in

a broader and integrated management framework (Gattuso et al., 2014). The 2019 IPBES Global Assessment Report on Biodiversity and Ecosystem Services has also called for the implementation of MPAs as a tool for action on safeguarding biodiversity and ecosystem services (IPBES, 2019).

International agendas such as the Convention on Biological Diversity's (CBD) Aichi Biodiversity Targets and the United Nation's Sustainable Development Goals (SDGs) have adopted targets to increase MPA coverage worldwide (Lubchenco et al., 2015; Sustainable Development Knowledge Platform, 2019). The CBD Aichi Biodiversity Target 11 called for protection of 10% of the ocean surface through MPAs by 2020 (Lubchenco et al., 2015). This target has placed a strong focus on areas that are particularly important for biodiversity and ecosystem services, such as tropical coral reefs within the Pacific Ocean that contribute to the well-being of thousands of people (Lubchenco et al., 2015; Woodley et al., 2012; Woodhead et al., 2019). The SDGs also included an MPA target under Goal 14, Life Below Water (Sustainable Development Knowledge Platform, 2019). This target has stated that 10% of the ocean should be conserved through MPAs by 2020, reflecting the CBD Aichi Biodiversity Target 11 (*ibid.*).

While only 50% of the Aichi Biodiversity and SDG 14 2020 goals have been achieved to date, the scientific community and the IUCN have expressed support for a further and stronger global goal of protecting at least 30% of the ocean surface by 2030 under MPAs (Sala et al., 2018; Lubchenco et al., 2015). Critically, the 30% goal for 2030 only encompasses MPAs that are implemented, and only includes either highly or fully protected areas. Highly or fully protected MPAs prohibit and eliminate all extractive and destructive activities (Lubchenco et al., 2003; Marine Conservation Institute, 2020;

Oregon State University et al., 2019; Nursey-Bray & Rist, 2009). On the other hand, lightly and minimally protected areas allow for several extractive activities (*ibid.*). As it stands today, only 2.5% of the 5.3% of implemented MPAs covering the global ocean are classified as highly or fully protected areas (Marine Conservation Institute, 2020). The proposed goal of 30% by 2030 is therefore ambitious, but it is also likely to drive the establishment of more highly or fully protected MPAs in the coming decade (MPA News, 2016; Lubchenco et al., 2015).

## 2.2 The case for highly protected MPAs

As conservation of biodiversity is the primary objective for MPAs, ecological functioning is at the forefront of decisions made surrounding the level of protection assigned to MPA networks (McLeod et al., 2009; White et al., 2014; Fernandes et al., 2012). According to a recently released MPA guide from several international groups including the IUCN World Commission on Protected Areas (IUCN-WCPA) and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), conservation outcomes will be greater for MPAs with higher levels of protection (Oregon State University et al., 2019).

There is research that supports the claim that at least 30% of the ocean needs to be highly or fully protected to achieve biodiversity conservation objectives. These objectives include (O'Leary et al., 2016):

- protecting biodiversity,
- ensuring ecological connectivity between MPAs,
- avoiding fish population collapse and ensuring persistence,
- maximising fisheries values and yield, and

- satisfying multiple MPA stakeholders.

Highly protected MPAs have demonstrated significant average increases of biomass, density, organism size and organism richness (Lester et al., 2009). Several ecological principles that have been developed and refined over the last decade have identified high levels of protection within MPAs as important for ecological functioning (McLeod et al., 2009; White et al., 2014; Fernandes et al., 2012).

There has been debate on what level of protected is required to achieve MPA outcomes for biodiversity conservation. Research has examined if highly protected MPAs can achieve biodiversity and fisheries objectives simultaneously (O'Leary et al., 2016; Hilborn et al., 2004). This is a particularly crucial debate for regions that rely on fish for subsistence (Cinner et al., 2016; Cinner et al., 2007; Johannes et al., 2000). Some research has shown that highly protected MPAs have substantial benefits for fisheries in adjacent and nearby areas which are unprotected (Sala et al., 2017). A meta-analysis of 10 scientific studies assessed the recovery of fish biomass in waters adjacent to highly protected MPAs and partially protected MPAs, which allow for varying levels of fishing activity. This research showed that biomass of fish assemblages increased by 670% in fishing areas adjacent to highly protected MPAs when compared to unprotected areas. This was a substantially higher result compared to partially protected MPAs, which improved biomass of nearby fish assemblages by 183%. This finding indicated that highly protected MPAs provide a spill-over effect of fish into nearby unprotected areas where fishing takes place, contributing to a sustainable, long-term increase in fish stocks (*ibid.*).

While highly protected MPAs have promising benefits for biodiversity conservation, there have been several criticisms made against the top-down management approach

that is often adopted during decision making processes for their design and implementation (Ban et al., 2018; Ban et al., 2011; Nursey-Bray & Rist, 2009; Fernandes et al., 2012). As the establishment of MPAs has grown over the past two decades, a new phenomenon of ocean grabbing has also appeared, whereby conservation initiatives have deprived small-scale fishers of resources and local, traditional, and Indigenous communities access to culturally significant sites (Ban et al., 2018; Bennett et al., 2015; Nursey-Bray & Rist, 2009; Hilborn et al., 2004). Poor attempts to consult and include local and Indigenous communities within MPA governance and management have been extremely problematic for communities in developing nations that interact with and rely on marine environments daily for subsistence and cultural enrichment (Remling et al., 2016; Ban et al., 2018; Ban et al., 2011; Veitayaki et al., 2004). When these localities become highly protected MPAs, it can cause extreme hardship for the communities that are unable to fish, or have an imposed and shortened fishing season and potentially need to travel with limited resources to fishing areas that are further away and unfamiliar (Hilborn et al., 2004).

Partnership and consultation with local and Indigenous communities should also occur during the pre-establishment stages of MPAs. The IUCN has called for the realisation of effective partnerships with Indigenous peoples and local communities in its recently released supplementary guidelines for MPAs (Day et al., 2019). This recognition of Indigenous peoples and local communities as partners within marine management, however, is not always reflected in reality (Hepi et al., 2018; Ban et al., 2018; Remling et al., 2016). The issues that local and Indigenous communities face within systematic conservation management around the world will be examined and explored in the following sections.

## 2.3 Inclusion of local communities and Indigenous peoples within systematic conservation management and governance

The message that the knowledge held by Indigenous, traditional, and local communities needs to be valued alongside scientific knowledge for the protection of natural environments has been expressed by major groups and stakeholders during their closing statements at the fourth session of the United Nations Environmental Assembly (UNEA 4) in 2019 (United Nations Environmental Programme, 2019a; United Nations Environmental Programme, 2019b). The Indigenous People's Major Group called for the knowledge, practices and innovations of Indigenous peoples to be recognised as equal to scientific knowledge, and that these are integrated as essential elements in achieving sustainable management of resources, reducing greenhouse gas emissions and improving biodiversity (United Nations Environmental Programme, 2019a). The Science and Technology Major Group also stated that it aims to work in partnership with local, traditional and Indigenous communities through citizen science approaches that incorporate local knowledge in active and meaningful ways (United Nations Environmental Programme, 2019b). The language used in both these statements signifies the importance of centralising LEK within systematic conservation models and strengthening the engagement of local, traditional and Indigenous communities for the effective management of ecosystems at the highest level of global environmental governance.

Several researchers have acknowledged the challenges that exist for local communities and Indigenous peoples regarding their involvement and support of local culture within systematic conservation planning (Remling et al., 2016; Ban et al., 2018; Dick et al., 2012; Nursey-Bray et al., 2014; Von der Porten, et al., 2016; Nursey-Bray & Rist, 2009). Top-down decision-making processes have typically placed high value

on scientific knowledge and historically dismissed local knowledge as a barrier to environmental and development issues (Remling et al., 2016; Gaymer et al., 2014; Dick et al., 2012; Barragan-Paladines and Chuenpagdee, 2017). This approach has resulted in the development of international ready-made solutions within developing and least developed countries (LDCs) that are not well communicated in local languages, or within cultural context (Remling et al., 2016). Poor communication and minimal consideration of local communities and has led to the existence of entrenched power relations between local communities, western scientists and environmental managers (Jollands & Harmsworth, 2007; Remling et al., 2016; Hepi et al., 2018). Communities have been left marginalised and isolated within the management of natural resources, and as a result, many have developed suspicion and mistrust of western science-driven knowledge systems (Hepi et al., 2018).

While the human and cultural dimensions of marine environments have been increasingly considered within MPA management over the past decade, community perspectives are often not adequately integrated into management and decision-making processes (Ban et al., 2011). While LEK held by fishers has been identified as critical for improving marine management through location-specific knowledge on species, habitats, and the improvement of coastal ecosystem monitoring, its inclusion within marine management often fails to fully consider a two-way exchange of knowledge between local communities and fisheries management systems (Anbleyth-Evans & Lacy, 2019; Johannes et al., 2000; Azzurro et al., 2011). Anbleyth-Evans and Lacy (2019) research explored exchanges between scientific knowledge and fishers' LEK for marine conservation zone decision making processes in England, and identified that fishers today in England place higher value on scientific knowledge compared to previous generations of fishers. Younger fishers reportedly criticised



older fishers for their mistrust in science, and expressed the belief that this dynamic has contributed to a breakdown in governance and trust between government, scientists, and older generation fishers (*ibid.*). Anbleyth-Evans and Lacy (2019) explained that the current exchange of knowledge in English marine conservation zones is still largely one-directional, and that two-way communication between scientists and fishers could allow fishers to contribute and share their knowledge on marine species rather than passively benefiting from scientific research. Older fishers that were interviewed had records on species that had declined over time, which could benefit governance of marine conservation zones if knowledge exchange between science and fishers LEK flowed both ways (*ibid.*).

The issue of power has been discussed by Fernandez-Gimenez et al. (2006) who investigated how indigenous knowledge and science were defined by indigenous knowledge holders and scientists, to better understand if the meaning of these two terms varied from stakeholder to stakeholder. An important finding from Fernandez-Gimenez et al. (2006) research was that Indigenous knowledge holders perceived science as a power structure as well as a knowledge system, whereas scientists did not view science as having power over any other form of knowledge. As Indigenous knowledge holders are often operating within the constraints of western systems of environmental management, it is crucial that western scientists and environmental managers develop flexibility and recognise their responsibility to change top-down processes that marginalise Indigenous communities (*ibid.*).

Similar findings emerged from research by Hepi et al. (2018), who looked at how mātauranga Māori, the body of knowledge held by Māori in Aotearoa, was incorporated into the decision-making processes for Kaipara Harbour, a marine

ecosystem and resource undergoing a significant loss in biodiversity. They found that different notions of the term 'partnership' existed between Kaipara Harbour stakeholders, including iwi, scientists and environmental managers. These differences were particularly prevalent in the beginning phases of the decision-making processes, with some stakeholders reporting that they were frustrated at how long the relationship-building, planning and talking phases were taking as they preceded strategic action and planning phases (*ibid.*). Hepi et al. (2018) also found that leadership from the hapū (subtribe) Te Uri o Hau was crucial for successfully integrating mātauranga into decision-making processes for Kaipara Harbour.

## 2.4 Recognising Indigenous rights through dual objectives for MPAs

A recent review conducted by Ban et al. (2018) discovered that less than 0.5% of all publications on MPAs examined the involvement of Indigenous communities within MPA governance and management. Case studies based in the Pacific Island region, New Zealand, Australia, and Canada have looked into the inclusion of Indigenous Peoples within MPA governance and management in both co-managed MPAs, adaptive co-management, and state-led MPAs (Berkes, 2007; Zurba et al., 2012; Jupiter & Egli, 2011; Jones et al., 2010). An important finding from Ban et al.'s (2018) research was that dual objectives for MPAs that equally aimed to achieve biodiversity conservation and support Indigenous rights through integration of cultural and social goals existed across the case studies. Further to this, the incorporation dual objectives into MPA management recognised the essential role that marine ecosystems and habitats have for the continuation of cultural practices and transferring of LEK within communities and across generations (*ibid.*). However, social dynamics between local and regional stakeholders are often barriers for successful realisation of dual

objectives within MPAs, with ministries and ministerial actors still holding power over final decisions made within MPA management (Jones et al., 2010; Ban et al., 2018; Ban et al., 2011).

Several researchers have highlighted the success of co-managed marine areas for protecting marine environments (Cinner et al., 2016; Jupiter & Egli, 2011; Ban et al., 2011). Unlike state-led MPAs, co-managed areas often incorporate a bottom-up approach to marine management with local and Indigenous communities taking a central role in management and decision-making alongside stakeholders that commonly operate state-led MPAs (Cinner et al., 2016; Cinner, 2007; Ban et al., 2011; Jupiter & Egli, 2011; Veitayaki et al., 2004; Nursey-Bray & Rist, 2009). Often co-managed marine areas are small and locally-led, and report high levels of engagement and support from local communities (Jupiter et al., 2011; Nursey-Bray & Rist, 2009; Ban et al., 2011).

Many co-managed marine areas are not considered MPAs because they identify cultural objectives as their key priorities, and biodiversity conservation successes may be incidental (Nursey-Bray & Rist, 2009; Ban et al., 2011; Day et al., 2019). Cultural objectives for MPAs often involve stewardship and guardianship of the environment that contribute to conservation outcomes (Dodson, 2014; Turner et al., 2012; Ban et al., 2011). An example of this is traditional cultural practices through kaitiakitanga in New Zealand (Dodson, 2014). Kaitiakitanga is a way of managing and protecting the natural environment through the holistic perspective that people are closely connected to nature, that involves sustainable use of resources as well as rāhui (a temporary restriction of access to resources) to support culture, people, and conservation (Dodson, 2014; Environment Foundation, 2018). The recently released supplementary

guidelines for MPAs has explicitly stated that the primary aim of an MPA needs to be conservation of nature, and that cultural values need to take second place when a conflict in achieving both objectives arises (Day et al., 2019). This understanding adopted by the IUCN means that co-managed areas that do not comply with a prevailing primary aim of marine conservation can be classified as Other Effective Area-Based Conservation Measures (OECMs), which may contribute to the objectives of a MPA network but do not receive MPA status (*ibid*).

Recent research by Cinner et al. (2016) demonstrated that investment in participation and property rights within marine areas has the potential to greatly improve biodiversity conservation outcomes. Cinner et al. (2016) found that healthy coral reef ecosystems exist within coastal communities where there is strong local involvement in their management, respected local ownership rights, and traditional management practices. Cinner et al. (2016) described these locations as 'bright spots'. A key aspect to this finding was that the bright spots were not necessarily pristine marine environments, but were defying expectations with fish populations (*ibid*). Many of the bright spots identified by Cinner et al. (2016) were located within the Pacific Island region, a culturally diverse region with many low-lying islands that remain under various forms of customary tenure that are tied to cultural and national identity (SPREP, 2017; Forsyth, 2011; Veitayaki et al., 2004; Jupiter & Egli, 2011; Tawake et al., 2001). It is also home to the Locally Managed Marine Area (LMMA) network, a co-managed marine area network that has expanded from local and into a regional co-management of marine ecosystems (Veitayaki et al., 2004; Jupiter & Egli, 2011; Govan, 2009a).

## 2.5 Locally Managed Marine Areas (LMMAs): An example of bottom-up, community-based resource management practices in the Pacific Island region

Locally Managed Marine Areas (LMMAs) are a co-management approach to conservation and the sustainable use of marine resources, involving a hybridisation of local and formal scientific knowledge and systems of resource management (Govan, 2009b; Jupiter et al., 2014; van Beukering et al., 2007). For LMMAs, the use of the word 'local' is deliberately chosen to represent the several different stakeholders (communities, governments and non-governmental organisations) working in partnership to manage marine areas (Govan, 2009b; Jupiter et al., 2014). This differs from the universal understanding of local in MPAs, where governments and non-governmental organisations are considered state stakeholders (Ban et al., 2011). The LMMA Network was originally established in Fiji, and has now spread across the Pacific Island region, South-East Asia, the Caribbean, and the Indian Ocean (The LMMA Network, 2019). The Pacific Island region alone has over 565 LMMAs that cover more than 12,000km<sup>2</sup> across 15 Pacific Island countries (Govan, 2009b; Govan & Jupiter, 2013).

The Fiji LMMA (FLMMA) network is an illustration of how bottom-up community-based resource management practices gained long-term support from local communities and government, mainstreaming resource conservation and influencing policy development (Veitayaki et al., 2004; van Beukering et al., 2007). The FLMMA approach facilitated a revival of traditional resource use to best achieve community-based conservation outcomes (*ibid.*). Legislation and government resource management activities had been unsuccessful, and the FLMMA allowed communities

to take an active part in the management of marine resources and organise themselves through traditional resource use practices (*ibid.*).

The FLMMA is fundamentally about partnership (Veitayaki et al., 2004). It aimed to address the previous resource management dynamics in the region where communities were working in isolation, and organisations were competing with each other (*ibid.*). Social contracts between FLMMA partners drawn on common values allow for a genuine partnership between conservation practitioners and organisations, where suspicion and rivalry had existed in the past (Veitayaki et al., 2004; Tawake et al., 2001). Another crucial aspect of these social contracts is that they were not legally binding, as FLMMA considered that social commitments had a greater ability to untangle existing conflicts. This approach has led to greater cooperation between FLMMA partners and has had great results for improving conservation. The MPAs operating under the FLMMA models simultaneously increased fish stocks for communities for subsistence and commercial purposes (*ibid.*).

Under the FLMMA model, no-take marine areas were designed based on size and location so that biological processes could take place (Veitayaki et al., 2004; Tawake et al., 2001; Govan et al., 2009). Crucially, the size and location of these no-take areas were arranged by communities using traditional practices and considered alongside areas open to fishing that were also big enough to support community daily requirements and activities. The use of monitoring, analysing and discussion of results of these no-take areas allowed communities to make better decisions, and at times have led to the community imposing longer fishing restrictions to account for biological processes for marine species (*ibid.*).

While the FLMMA model has many promising opportunities for both biodiversity conservation and community support and engagement, there are some limitations to the model. Some FLMMA rely on donor investments, and given the current weak state of the global economy, it may be unrealistic to assume that funding will continue to support its expansion in years to come (Jupiter et al., 2011; Mills et al., 2011; MPA News, 2016). Additionally, the FLMMA model often adopts opportunistic establishment of new FLMMA sites, which do contribute to national biodiversity outcomes but fall considerably short of what is required (Mills et al., 2011; Jupiter & Egli, 2011). This is particularly true for LMMA sites that are opportunistically established in the short-term to encourage increases in fish catch, and as a result, may not achieve long-term objectives for sustainable fisheries and biodiversity conservation (Jupiter et al., 2011). While systematic conservation planning is not recommended over the FLMMA model, the incorporation of systematic assessments for the selection of FLMMA sites could allow for better achievement of national biodiversity and sustainable management outcomes (Mills et al., 2011).

Like MPA networks, the LMMA network extends across countries and cultures that are ecologically connected. There are thought to be hundreds more community-based marine resource and fisheries management areas within the Pacific Island region that fall within the LMMA definition, but have not been officially classified (Govan, 2009a; Jupiter et al. 2014; Vierros et al., 2010). Further, not all of the classified LMMAs are recognised under global MPA databases such as Atlas of Marine Protection and World Database on Marine Protected Areas (WDPA-Marine) (Marine Conservation Institute, 2019; Vierros et al., 2010). An example of this can be seen in Fiji, which reportedly had 217 operational LMMAs in 2010, but only 15 MPAs listed on WDPA-Marine (Vierros et al., 2010). This is a likely scenario for many other Pacific Island countries

and implies that, not only are global databases for MPAs incomplete, they also fail to fully recognise the contributions of smaller community-based marine management efforts in the Pacific Island region towards immanent development and international MPA targets set by the CBD and UN (*ibid.*).

## 2.6 The Pacific Island region: Leaders in the global MPA movement

The Pacific Island region has taken a leadership role in the political response to marine conservation, with the development and implementation of international MPA targets and improved ocean governance. In 2006, at the 12th Secretariat of the Pacific Regional Environment Programme (SPREP) Intergovernmental Meeting and Ministerial Forum, a decision was made to develop a regional framework for MPAs to strengthen the Pacific Island Region's conservation of coastal and ocean biodiversity (Vierros et al., 2010). From 2012 to 2015, Pacific Island countries campaigned for a stand-alone ocean goal to be included in the SDG 2030 Agenda (Quirk & Hanich, 2016). This campaign was successful and led to the development of SDG14, which included target 14.5, and calls for conservation of at least 10 per cent of coastal and marine areas, consistent with national and international law and based on best available scientific information by 2020 (Quirk & Hanich, 2016; Sustainable Development Knowledge Platform, 2019).

A number of MPA networks have been established in the Pacific Island region over the last two decades (Vierros et al. 2010; Rosen & Olsson, 2013). This includes the Micronesia Challenge: a partnership between Palau, the Federated States of Micronesia, the Marshall Islands, Guam and the Northern Marianas that aims to conserve at least 30% of nearshore marine resources (Vierros et al. 2010). The Coral



Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF) is another partnership that aims to sustain coastal and marine resources through directly addressing climate change, food security and biodiversity loss (Rosen & Olsson, 2013; Fernandes et al., 2012). This partnership exists between Indonesia, the Philippines, Malaysia, Timor-Leste, Papua New Guinea and the Solomon Islands (Rosen & Olsson, 2013).

The regional response to ocean management by Pacific Island countries and territories (PICTs) is potentially driven by the impacts that climate change is currently having and is predicted to have on the region's environmental, social, economic and cultural systems (SPREP, 2017; Jupiter & Egli, 2011; Veitayaki et al., 2004). Oceanic and coastal marine ecosystems, and the resources they provide, are central to livelihoods and cultural enrichment within the region (SPREP, 2017). While case studies on the involvement of Indigenous communities within MPA management and governance have been identified, there is a lack of empirical research on the inclusion of local and Indigenous communities at the regional level (Ban et al., 2018; Ban et al., 2011; Jupiter & Egli, 2011; Veitayaki et al., 2004). This study aims to address this gap by examining how LEK has been included within regional MPA management documents in the Pacific Island region.

## 2.7 Conclusion

In this chapter, key concepts and developments for the global MPA movement, alternative marine management (particularly Locally Marine Managed Areas (LMMAs) within the Pacific Island region) and the power dynamics that exist for local communities within systematic conservation models were critically examined and

explored. This identified key challenges for local and Indigenous communities within top-down management models, and a research gap on the inclusion of local and Indigenous communities within MPA management and governance. This research responds directly to this research gap by examining how LEK has been included within MPA management in the Pacific Island region. The next chapter will provide further information on the physical, social, economic, and political environment that exists within the Pacific Island region and influences regional ocean management.

## 3. BACKGROUND

### 3.1 Introduction

This chapter provides contextual information on the Pacific Island region, the chosen study area for this research project. The Pacific Island region is diverse, with several countries, states and territories that have different environments, languages, economies, cultural identities and challenges (Firth, 2018; Keener et al., 2013; Kinch et al., 2010; Pacific Islands Marine Protected Area Community (PIMPAC), 2020). The combined population of these countries, states and territories is nearly 11 million people.

For the purpose of this research project, I will focus on 14 countries and independent states that are politically independent or are self-governed under a free association with a developed nation. These 14 countries and states are: Fiji, the Cook Islands, Vanuatu, Kiribati, the Federated States of Micronesia, Marshall Islands, Nauru, Nuie, Tuvalu, Palau, Papua New Guinea, Samoa, Tonga and the Solomon Islands (United Nations Population Fund Pacific Sub-Regional Office (UNFPA), 2013). Each country and state has diverse environments, economies and cultural identities, and their key characteristics and consequential challenges cannot be generalised (Asian Development Bank, 2016). In this chapter I will be focusing on the commonalities shared by the 14 nations, and the challenges that persist across the entire Pacific Island region. The first section will outline the political status and geography of the region; this will be followed by a section that will provide contextual information on the region's marine ecology. The final section will examine challenges for development and the environment in the region.

### 3.2 Political status and geography

The political status of each of the 14 study countries and territories has important implications for development, demographic dynamics, and challenges that they face (UNFPA, 2013; Asian Development Bank, 2016). Fiji, Vanuatu, Kiribati, Nauru, Tuvalu, Papua New Guinea, Samoa, Tonga and the Solomon Islands are politically independent countries. The Federated States of Micronesia, Palau and the Marshall Islands are independent states associated with the United States, allowing citizens of these states to live and work in the United States. The Cook Islands and Niue have free association with New Zealand. The Solomon Islands, Kiribati, Tuvalu and Vanuatu are categorised as Least Developed Countries (LDCs), while the other 10 countries and territories are classified as developing nations (*ibid.*). There are over 1000 different ethnic groups and cultures within the Pacific Island region, and the majority of countries and territories are governed by Indigenous people with traditional tenure, governance and knowledge commonly used throughout (Govan et al., 2009a).

The 14 Pacific Island countries and territories are geographically and culturally divided into three subregions: Micronesia, Melanesia and Polynesia (UNFPA, 2013; Asian Development Bank, 2016; Govan et al., 2009a). Micronesia is located in the north of the Pacific Island region and is largely characterised by the atolls and low-lying islands of Nauru, Federated States of Micronesia, Palau, Marshall Islands and Kiribati (UNFPA, 2013; Asian Development Bank, 2016). Melanesia is located to the southwest, and is comprised of Vanuatu, Papua New Guinea, Fiji and the Solomon Islands (UNFPA, 2013; Asian Development Bank, 2016). Polynesia is towards the center and southeast of the Pacific Island region, and encompasses Tonga, Samoa,

the Cook Islands, Tuvalu and Nuie (UNFPA, 2013; Asian Development Bank, 2016). The entire Pacific Island region is a tropical environment, with wet and dry seasons that have great variations in rainfall and small variations in air temperature (Keener et al., 2013; Kinch et al., 2010). The ocean currents have a dominant role in determining weather patterns across the region, as the islands are geographically isolated and distributed across many square kilometres of ocean (Keener et al. 2013).

### 3.3 Marine Environment

Ocean and coastal ecosystems a hugely important resource for Pacific Island countries and territories. Fish is the major source of protein for nearly all Pacific Island countries and territories, with the exception of inland Papua New Guinea, providing both subsistence and income to livelihoods throughout the region (Govan et al., 2009). Beyond subsistence and income, the marine environment is inextricably linked to Island society and cultural identity within the region (*ibid.*). Indigenous peoples and local communities hold a critical role in conserving marine ecosystems, and have done so for millennia for a variety of reasons that include the safeguarding of livelihoods and cultural and spiritual values (Govan et al., 2009; SPREP, 2017). The Pacific Island region contains some of the most pristine marine habitats in the world with outstanding biodiversity (UNFPA, 2013; Keener et al., 2013). These marine habitats range from expansive and unique coral reef, mangrove and seagrass ecosystems to deep sea trenches and highly diverse pelagic environments (Keener et al. 2013). The isolated nature of the islands in the region has allowed the marine environment to remain relatively untouched and led to the development of many endemic species (Kinch et al, 2010; Keener et al. 2013).

The marine environment within the Pacific Island region is not only invaluable to people within the region but also to the rest of the world, as the largest ocean contributing to global ecological and biological functioning (Keener et al., 2013; Govan et al., 2009). However, it is fragile in the face of human activities such as agricultural and industrial development, commercial fishing practices and pollution (Keener et al., 2013; Kinch et al., 2010). It is vital to the lives of all Pacific Islanders that the marine environment is preserved, protected, governed and managed to reduce and mitigate these human-induced impacts. The challenges for achieving this will be discussed in the sections below (Keener et al. 2013; Kinch et al, 2010).

### 3.4 Challenges for development and ocean management

The Pacific Island region faces unique challenges with both development and ocean management. These challenges do not exist on their own but rather are interconnected.

#### 3.4.1 High population densities and urbanisation

On a global scale, all 14 Island countries and territories in the study have low populations (UNFPA, 2013). Population size varies greatly across the region, with Papua New Guinea, Fiji, and the Solomon Islands accounting for around 90% of the total population across the 14 countries and territories being studied (UNFPA, 2013). However, the Pacific Island region population is expected to increase from 11 million people to 17.7 million people by 2050, with the majority in Papua New Guinea, Vanuatu, Kiribati and the Solomon Islands (UNFPA, 2013; Firth, 2018). In addition, these countries and territories have areas with very high population densities which, along with population increases, will place pressure on infrastructure, services, water and food security and sanitation (UNFPA, 2013, Asian Development Bank, 2016).

These pressures pose serious health and environmental risks and are expected to exacerbate poverty within independent countries and LDCs that already have poor economic performance and growing inequalities (UNFPA, 2013; Govan et al., 2009; Firth, 2018).

Urbanisation is occurring on a global scale, with two-thirds of the global population predicted to be living within urban areas by 2050 (United Nations, 2019). Within the Pacific Island region, the UNFPA has described urbanisation as the modern-day form of migration, whereby individuals are moving away from rural areas and outer islands into urban centres (UNFPA, 2013). Alongside planned development, urban villages, a term that encompasses traditional villages located on urban centre boundaries as well as squatter settlements, have undergone increased growth in recent years (Asian Development Bank, 2016). In 2015, it was estimated that more than one million people in the Pacific Island region lived in urban villages (Asian Development Bank, 2016). Urbanisation has magnified the challenges associated with overpopulation and high population densities, and as a result, it has the potential to lower the resilience of Pacific Island countries and territories to health and environmental risks (Asian Development Bank, 2016). Urban villages and marine environments adjacent to urban centres have been exposed to pollution from strained waste management services and infrastructure, which increases the risk of disease spread and habitat loss (UNFPA, 2013; Asian Development Bank, 2016; Kinch et al., 2010). Increased sedimentation and nutrient loading from land use and urban infrastructure are decreasing the resilience of key marine habitats to global issues such as climate change (Kinch et al., 2010).

### 3.4.2 Isolation

Aside from Papua New Guinea, Vanuatu, Fiji, Kiribati and the Solomon Islands, countries and states within the Pacific Island region are expected to have very slow population growth (Firth, 2018; UNFPA, 2013). The population of the Federated States of Micronesia and the Cook Islands may decline, as many people are choosing to migrate to the United States and New Zealand (Firth, 2018). Small population sizes and densities present their own challenges, particularly to economic growth (UNFPA, 2013). Diseconomies of scale hinder development efforts, which results in low or no infrastructure, high transport costs, small markets and low human resources (Firth, 2018; PIMPAC, 2020). This can create a reliance on subsistence livelihoods (UNFPA, 2013). Subsistence livelihoods are both a strength and a challenge for the region. When they exist in combination with strong family and community structures, subsistence livelihoods form strong social safety nets for the population and often mean that the local natural environment remains largely intact (UNFPA, 2013). However, the heavy reliance on local ecosystems for subsistence faces new challenges in the form of global environmental issues such as the biodiversity crisis and the climate crisis (Keener et al., 2013; IPBES, 2019; Kinch et al., 2010).

Geographical isolation has posed challenges for the regulation, monitoring and the regional sharing and gathering of information pertaining to marine environments (PIMPAC, 2020; Kinch et al., 2010). This has been particularly true for scientific monitoring and research; key information on marine species is either undocumented or limited in particularly isolated areas in the region (Kinch et al., 2010). In addition, the sharing of knowledge about local marine environments between communities in the Pacific Island region has been hindered by isolation, which has made



communication about environmental risks or how to address these risks difficult (PIMPAC, 2020).

### 3.4.3 Climate change

Climate change acts as an amplifier for pre-existing vulnerabilities, which is particularly devastating in developing and least developed nations (LDCs) that do not have access to strong recovery mechanisms such as insurance, social protection and mobility that exist amongst developed nations (Wesselbaum & Aburn, 2019). Therefore, climate change presents itself as an urgent and multi-faceted challenge that has localised impacts on countries within the Pacific Island region (Keener et al., 2013; McMichael et al., 2019; IPCC, 2018). Across the region, the survival of vital ecosystems including coastal and marine environments, freshwater and forest ecosystems is threatened by climate change (SPREP, 2017). The decline and loss of these ecosystems would devastate livelihoods and cultural enrichment, which are intrinsically tied to natural resources from these vital ecosystems (SPREP, 2017). This in turn has the potential to undermine social and economic structures in the region (IPCC, 2018).

In addition, climate change is expected to bring catastrophic sea level rise and severe storms to the region which may make many countries and islands uninhabitable (SPREP, 2017; IPCC, 2018). This is particularly true for any degree of warming above 1.5 degrees Celsius (IPCC, 2018). As the ocean is the dominant driver for weather patterns in the region, increases in sea surface temperature in the Pacific Island region affect tropical cyclone formation, which results in exposed island countries and territories being extremely vulnerable to changes in the severity of extreme weather (Keener et al. 2013). With the threat of sea level rise, severe storms, and the loss of vital resources, climate migration may be the only viable option for many communities

within the region (IPCC, 2018; McMichael et al., 2019). Livelihoods in the region are highly localised and intrinsically connected to the surrounding environment (IPCC, 2018; IPBES, 2019). As a result, climate migration has the potential to displace many people and lead to the loss of cultural identity and LEK (IPCC, 2018; Firth, 2018; McMichael et al., 2019).

### 3.5 Conclusion

In this chapter, a description of the Pacific Island region's unique political, social, economic and physical marine environment was presented. Several key challenges pertaining to development and ocean management within the Pacific Island region were identified and explained. These challenges are dynamic, interconnected, and persist within Marine Protected Area (MPA) management. They are also critical for understanding the policy context for this research project. The next chapter will identify and discuss the strengths, weaknesses and process for this study's chosen research method, a reflexive thematic analysis.

## 4. METHOD

### 4.1 Introduction

In the previous two chapters, the cultural, ecological, political and social environment of the Pacific Island region was discussed, as well as the existing literature on Local Ecological Knowledge (LEK) systems, the Marine Protected Areas (MPAs) movement, and alternative approaches to marine management within the Pacific Island region and around the world. The body of literature reviewed in chapter 2 has informed the chosen research method for this study, a reflexive thematic analysis, which will be explained and outlined in this chapter.

The chapter structure is as follows. Section 4.2 outlines the research design, beginning with an explanation of reflexive thematic analysis, followed by a discussion of its use within environmental management research, and its value and limitations as a research approach. Section 4.3 will outline the specific procedure that was followed for this study, which includes the data collection and selection process. Section 4.4 concludes this chapter with comments on the appropriateness of the chosen research method for addressing the research aim and objectives.

### 4.2 Research design

The aim of this study is to examine how LEK has been included within MPA management within the Pacific Island region. Three objectives that are consistent with this aim have been developed to guide the analysis. These objectives are outlined in section 1.4. To address the research aim and objectives, this study used a reflexive thematic analysis approach outlined by Braun and Clarke (2006). This approach

consisted of a fully qualitative technique and will be explained in detail in the following subsections. Reflexive thematic analysis is a method commonly used within environmental management research (Anbleyth-Evans & Lacy, 2019; Hepi et al., 2018; Barragan-Paladines & Chuenpagdee, 2017). It has been employed to gain deeper insight into the integration of LEK within natural resource management across the world. It also has been used to examine the power dynamics that surround LEK systems, LEK holders, and modern conservation management and governance (*ibid.*) The use of reflexive thematic analysis within environmental management research will be discussed in detail in section 4.5.

#### 4.2.1 Reflexive thematic analysis

Thematic analysis is best understood as an umbrella term for a wide range of approaches that differ in procedures and philosophies, as opposed to a single analytical qualitative approach to research (Braun et al., 2006; Braun et al., 2019). Reflexive thematic analysis is a fully qualitative approach that has been widely used and variously applied across multiple areas of expertise (Braun et al., 2006; Aguinaldo, 2012; Ibrahim & Edgley, 2015). While it is easily accessible and widely used, the variety of different thematic analysis approaches that exist has created confusion surrounding the nature of reflexive thematic analysis (Maguire & Delahunt, 2017). It is crucial to its success as a method that the specific thematic analysis approach chosen is clearly stated and accurately followed within the research project and is suitable for the research purposes (Braun et al., 2019). The reflexive thematic analysis approach is fluid, non-linear and requires depth of engagement from the researcher with the data (*ibid.*). The researcher's reflexivity and subjectivity are central to the process, and the researcher's ability to be transparent and consistently reflexive while generating themes is key to its success as a method (Braun et al., 2019; Binder et al., 2012).

In reflexive thematic analysis, the researcher identifies themes that capture shared and patterned meanings within the data that are underpinned and united by a core concept (Braun et al., 2006; Braun et al., 2019). Themes are developed in relation to the research aim, or the key phenomenon that the researcher is seeking to understand (Braun et al., 2006). Importantly, themes are outputs, which are generated through the coding process (Braun et al., 2019). Using the researcher as the key instrument for generating themes is justified within reflexive thematic analysis as the focus of the method is not reliability or accuracy, but rather the depth of engagement, interpretation and immersion with the dataset (Braun et al., 2019).

#### 4.2.2 Strengths and limitations of reflexive thematic analysis for environmental management research

Reflexive thematic analysis was identified as the most appropriate research method for this study for several reasons. It is an advantageous approach for researchers who are new to qualitative research because it is not tied to a theoretical perspective, and as such does not require comprehensive familiarisation with complex theoretical frameworks prior to conducting qualitative data analysis and interpreting results (Braun & Clarke, 2006; Braun et al., 2012; Anbleyth-Evans & Lacy, 2019). Instead, it allows the researcher to systematically interpret data, which can then be linked to broader theoretical and ideological frameworks (Braun et al., 2012).

Reflexive thematic analysis also allows for a deeper exploration and examination of social phenomena compared to other thematic analysis approaches, such as codebook thematic analysis or coding reliability thematic analysis (Braun et al., 2019). These alternative approaches are underpinned by quantitative philosophies, which involve structured coding processes to ensure the reliability of the statistical measures of the dataset. A limitation of these alternative approaches is that they do not allow for

the same level of depth in the exploration of themes, due to the structured process required for achieving statistical reliability. Through the fluid and flexible nature of reflexive thematic analysis, researchers are not tied to following a linear process, but rather can reflect on their process and the themes generated while undertaking the research, and at times alter processes when required, which leads to a deeper understanding of the subtleties of social phenomena (*ibid.*). Braun et al. (2019) stated that the reflexive thematic analysis approach is particularly useful for research with a social injustice agenda for this reason.

Researchers undertaking similar environmental management research to this study have applied a reflexive thematic analysis approach. After conducting an Environmental Impact Assessment, Anbleyth-Evans & Lacy (2019) applied a reflexive thematic approach to interpret semi-structured interviews with fishers and determine the use and value of LEK within marine conservation in England. Anbleyth-Evans & Lacy (2019) explained that reflexive thematic analysis allowed them to examine how LEK was used and deployed within their dataset.

Hepi et al. (2018) applied an inductive reflexive TA approach to examine how mātauranga Māori, the body of knowledge held by Māori, was incorporated into planning and decision-making processes for Kaipara Harbour in Northland, New Zealand. Data was collected through semi-structured interviews with key stakeholders for the Kaipara Harbour. The themes generated from semi-structured interviews were then used to inform internal workshops held with a key stakeholder for Kaipara Harbour, which in turn added an extra layer to the analysis, allowing the researchers to identify enablers and barriers to the uptake of mātauranga within management (*ibid.*).

Barragan-Paladines and Chuenpagdee (2017) applied a deductive reflexive thematic analysis approach to three types of data: semi-structured interviews with local, national and international representatives of interest groups; observation notes from public meetings and consultations, and informal conversations with participants. From these datasets, Barragan-Paladines and Chuenpagdee (2017) generated themes connected with the establishment of the Galapagos Marine Reserve that uncovered hidden interests and conflictive political agendas that were influential in the process of the designation of the reserve. Barragan-Paladines and Chuenpagdee (2017) stated that employing the reflexive thematic analysis approach allowed for a deeper conceptualisation of the social dynamics to develop within their research.

The conceptualisation of themes within reflexive thematic analysis approaches has been criticised by some researchers as too unsophisticated to gain understanding (Braun et al., 2019). They argue that this is particularly apparent when the conceptualisation of themes consists of surface-level summaries or descriptions of the research subject (Braun et al., 2019). Braun et al. (2019) have acknowledged this criticism and note that radically different conceptualisations of themes have been generated within research that has used the reflexive thematic analysis approach, and that this has largely been a result of confusion across thematic analysis approaches. They noted that sophistication can be achieved within reflexive thematic analysis, but it relies on the researcher's depth of engagement and immersion in the dataset and on their capacity to delve deeply into the subject by conceptualising themes as stories that represent particular patterns of shared meaning across the data (Braun et al., 2019).

The presence of researcher bias within fully qualitative research approaches such as reflexive thematic analysis has been identified as a factor that can limit the research project's credibility when it is not adequately addressed (Willig, 2008; Atieno, 2009). All researchers are unique individuals that have unique perceptions which can introduce bias into the research project. There are ways to mitigate researcher bias. These include full disclosure and recognition of the individual bias that the researcher may bring to the research through their experiences and culture through critical reflexivity (*ibid.*). Critical reflexivity will be discussed further in section 4.3. Researchers can also employ methods of triangulation to reduce researcher bias and provide validation of fully qualitative inquiry (Fusch et al., 2018; Hepi et al., 2018; Anbleyth-Evans & Lacy, 2019; Modell, 2005). Triangulation can be achieved through either the inclusion of two other research methods (including qualitative and quantitative) or through the inclusion of two other perspectives on how data has been interpreted by the primary researcher (*ibid.*).

### 4.3 Researcher's role

Reflexive thematic analysis utilises the researcher as the key research instrument for the interpretation of data (Braun et al., 2019). The success of researcher's role as the key research instrument relies on the researcher's critical reflexivity. Reflexivity requires the researcher to be aware of their own construction of meaning throughout the research process and to critically reflect on their position in relation to the subject matter (Willig, 2008). It is, therefore, important to disclose my motivations for undertaking this research project, as well as acknowledge how my cultural identity, education and values might influence the collection, interpretation and explanation of data.



I identify as a female Pākehā New Zealander. As a Pākehā woman, my attempt to effectively examine and gain a deeper understanding of the inclusion of Indigenous, traditional and local knowledge within marine management requires acknowledgement of my white privilege. I acknowledge that my Northern European ancestors who migrated to Aotearoa five generations ago had a role in the harmful impacts of colonisation that historically and currently affect Aotearoa. I also acknowledge that ignorance of white privilege is unacceptable, and that to provide meaningful insight into the research topic and to contribute to the research field, I will need to engage in self-criticism to challenge and report on any potential bias that my ethnicity and its associated privilege may present to the topic.

My education includes a post-graduate diploma in environmental management, as well as an undergraduate double degree majoring in geology and psychology and minoring in media studies. While completing this research, I took on a position as a guide and educator at Zealandia Ecosanctuary, a protected area with the primary goal of biodiversity conservation. During my postgraduate studies in environmental management and my work experience at Zealandia, I gained knowledge about the intersectional nature of environmental issues and social injustice issues. I support the conservation of biodiversity, and I hold the belief that all people working and researching within environmental fields need to be aware of the potentially disproportionate impacts of environmental management on Black, Indigenous and People of Colour (BIPOC). This standpoint, partnered with a deep care and appreciation for the ocean, has provided my motivation for improving the understanding of how LEK is included within MPA management in the Pacific Island region. These multiple positionalities constitute the particular position from which I have critically examined the data gathered for this study. Additionally, I am aware that

these multiple positionalities may, consciously or subconsciously, introduce bias into the interpretation of data for this research. To mitigate this, I have employed a triangulation approach for the selection and interpretation of my dataset, through obtaining two additional perspectives on how I have interpreted the data from my supervisors.

## 4.4 Data collection and procedure

Braun et al. (2006) presented a six-step procedure for conducting a reflexive thematic analysis. Braun et al. (2019) have stressed the importance of the fact that the six-step procedure reflects the values of the qualitative paradigm: it is fluid, non-linear and requires depth of engagement from the researcher with the data. The researcher's reflexivity and subjectivity are central to the process, and the researcher's ability to be transparent and consistent in their reflexivity is key to the success of reflexive thematic analysis (Braun et al., 2019).

### 4.4.1 Data collection

This project used secondary data to conduct the reflexive thematic analysis. Four publicly available frameworks and action plans for MPAs within the Pacific Island Region were selected for analysis. These documents were: the Framework for Nature Conservation and Protected Areas (FNCPA) in the Pacific Island Region 2014-2020; the Framework for a Pacific Oceanscape 2010; the National Biodiversity Strategy and Action Plan for Fiji 2017-2024, and the National Biodiversity Strategy and Action Plan for Palau 2015-2025 (see Table 1).

Table 1: A list of the four publicly accessible documents selected for this study's dataset (SPREP, 2014; Pratt & Govan, 2010; Palau Conservation Society, 2016; Government of Fiji, 2017).

Regional frameworks pertaining to MPAs	Corresponding action plans to the regional frameworks
<ul style="list-style-type: none"> <li>• Framework for Nature Conservation and Protected Areas in the Pacific Island Region (2014-2020)</li> </ul>	<ul style="list-style-type: none"> <li>• National Biodiversity Strategy and Action Plan for Fiji (2017-2024)</li> <li>• National Biodiversity Strategy and Action Plan for Palau (2015-2025)</li> </ul>
<ul style="list-style-type: none"> <li>• Framework for a Pacific Oceanscape (2010)</li> </ul>	<ul style="list-style-type: none"> <li>• Framework for a Pacific Oceanscape (2010)</li> </ul>

#### 4.4.2 Selecting documents for the dataset

The term “MPA” is an umbrella term for several different types of marine management and marine protection, and so a combination of search terms was used to capture the variety of expressions used to refer to marine management within regional documents online. The 29 search terms used for capturing data on LEK, MPAs and the Pacific Island region are detailed in Table 2.

Twenty-eight documents of interest were obtained through the following databases: Google; SPREP; the Pacific Islands Forum, and the Pacific Islands Protected Area Portal (PIPAP) over a period of 1.5 months between 15 July and 30 August 2019. These documents were organised within an Excel spreadsheet under the categories of frameworks, guides, action plans, strategic plans, reports and policies. Each document was then reassessed for its relevance to the research aim, namely, to determine how LEK is included within MPA management in the Pacific Island region.

The scope was then limited to regional frameworks and action plans that are still active in the present day, as these documents would provide information on the region's stated actions for MPAs and the implementation processes and plans for achieving the stated actions. This scope limited the dataset to 12 of the 28 original documents. Due to the time restrictions on conducting the study, and the depth of engagement required for a robust analysis, four documents were chosen for analysis: two frameworks and two action plans (see Table 1). The criteria for choosing the two frameworks for analysis was public accessibility and highest relevance to MPA decision making processes and governance. The criteria for choosing the two action plans was public accessibility, correspondence to the chosen frameworks, and representation of two subregions in the Pacific (Micronesia and Melanesia).

Creswell and Creswell (2017) noted that there are some limitations to relying solely on document analysis. These include the potential for incomplete materials, inaccurate materials and that some information relative to the subject matter may be protected from public access (Creswell & Creswell, 2017). These limitations were mitigated as much as possible by ensuring documents were written and published by authoritative organisations within the Pacific Island region such as the Pacific Island Forum and SPREP.

Table 2. A table depicting the combination of search terms used while selecting online documents for the dataset.

<b>Main Topics</b>	<b>Local Ecological Knowledge</b>	<b>Marine Protected Area</b>	<b>Pacific Island Region</b>
<b>Search Terms</b>	Local Ecological Knowledge	Marine Protected Area	Pacific Island Region
	Traditional Ecological Knowledge	Marine Management	Pacific
	Indigenous Ecological Knowledge	Ocean Management	Pacific Islands
	Ecological Knowledge	Coastal Management	Oceania
	Traditional Knowledge	Fisheries Management	
	Local Knowledge	Locally Managed Marine Area	
	Indigenous Knowledge	Marine Management Area	
	Traditional Indigenous Knowledge	Marine Reserve	
	Knowledge	Community Conserved Area	
	Community Knowledge	Community Management	
	Fisher's Knowledge	Tabu/Taboo Area	
		Community-based resource marine management	
		Marine resource management	
		Contemporary Resource Management	

*Note.* Columns were combined with AND; rows were combined with OR.

## 4.5 Procedure

The six-step process outlined by Braun et al. (2006) for conducting a reflexive thematic analysis was followed for this research project. This six-step process was guided by the research aim and objectives identified in sections 1.3 and 1.4. Each of the six steps for the procedure will be described in the subsections below.

#### i) Familiarisation with data

This step involved immersion in the dataset through repeatedly and actively reading the content to identify patterns and meanings. Initial ideas for codes were recorded in a notebook, to be reassessed in later phases. These initial ideas for codes were: centralising LEK; empowering LEK; Pacific Island cultures are interconnected with the ocean; reclaiming power through LEK; sustainable use, management and conservation are one and the same, and no inclusion of Euro-centric MPA documents.

#### ii) Generating initial codes

Having recorded initial notes in the previous phase, the subsequent step involved producing codes for the analysis. In total, 13 codes with over 400 raw data examples, were generated. These codes were initially manually recorded in a notebook and later input into Nvivo for recording purposes. Many of the 600 raw data examples taken from the dataset overlapped across codes. The initial interpretation was that extracts from the data reflected several codes at the same time.

Later on in the analysis, during step iv, it became obvious that the codes overlapped with each other. This led to reworking the data codes and merging six codes with the following result: LEK is an essential cultural component of livelihoods; biodiversity conservation safeguards LEK and livelihoods; livelihoods rely on ecological functioning; securing a future for livelihoods is central to MPAs; LEK leads to more effective biodiversity conservation, and marine environments and Pacific Island cultures have a longstanding, interconnected relationship. It became clear that these six codes interlinked and overlapped with each other within the dataset, and that each code represented an aspect of the three-way relationship that exists between LEK, livelihoods and biodiversity conservation. This led to the generation of this study's first

theme: LEK, livelihoods and biodiversity conservation are interconnected and essential components of MPAs.

### iii) Searching for themes

During this step, codes are reviewed to see if they can potentially be combined to form an overarching theme or themes. As identified in the previous step, the first theme had been generated through the collation of six codes. From the remaining codes, three potential themes were identified. The first addressed the delegation of power to local communities through the inclusion of LEK. The second examined the inclusion of international-level documents, agreements and bodies within the dataset. The final theme explored the dynamic between regional and international level inclusion of LEK within MPA targets in the dataset.

### iv) Reviewing themes

This phase takes place in two stages. Stage one involves reviewing all data codes to ensure they follow a coherent pattern. If this is not the case, then themes and/or data codes need to be reworked or discarded. At this point, it was clear that the data codes needed to be reworked and the analysis returned to step ii.

Once the data codes had been reworked, a holistic review of the entire dataset took place. This involved rereading the documents included within the dataset, and critical reflection of the interpretation of the dataset so far, to ensure that the themes and codes developed accurately represented the whole dataset. At this point, the second theme was generated. This theme was titled: LEK is a tool that allows communities to have and regain power over marine resources through MPA management and governance. The third theme combined two of the previous themes identified in stage

iii. This theme was titled: misalignment between regional and international level inclusion of LEK within MPA management.

v) Defining and naming themes

The three themes were defined through a refining of the raw data extracts that had formed each theme to ensure that they were logical and internally consistent with each other. In addition, a summary was formed alongside each of the three themes, to ensure they related to the aim and objectives of the research.

vi) Producing the report

This is the final stage of the procedure, in which the themes are described and demonstrated using extracts from the dataset. This stage, along with a summary of the three themes generated through steps 1-5, will be described in detail in the results chapter (Chapter 5).

## 4.6 Conclusion

In this chapter, reflexive thematic analysis was identified as the most appropriate method for addressing the research aim and objectives, through identification of research methods used in similar environmental management studies, its accessibility as a qualitative approach for new researchers and its ability to allow the researcher to gain deeper understanding on social phenomena. As the researcher, I am the key instrument for data interpretation. I have critically reflected on my role as the researcher, and how my experiences, ethnicity, values, and education might introduce bias into the interpretation. To mitigate researcher bias, I have employed methods of triangulation through use of my two supervisors as extra opinions on my interpretation of the dataset.



The data collection process and procedures have led to the generation of three themes from four publicly accessible regional frameworks and action plans pertaining to MPAs. These themes are titled: LEK, livelihoods and biodiversity conservation are interconnected and essential components to MPAs (theme i), LEK is a tool that allows communities to have and regain influence over marine resources through MPA management and governance (theme ii), and misalignment between regional and international level inclusion of LEK within MPA management (theme iii). The next chapter will summarise these three themes and present the key findings for this research.

## 5. RESULTS

### 5.1 Introduction

In the previous chapter, the reflexive thematic analysis method that was employed to examine and interpret the content of the Pacific Island regional Marine Protected Area (MPA) frameworks and action plans was explained. The final step of the reflexive thematic analysis method involved producing a report that presents the generated themes as findings for this research project (see section 4.5). This chapter will present the qualitative results from the examination of the Pacific Island region's commitment to include Local Ecological Knowledge (LEK) within its regional MPA frameworks and action plans. In line with the final step of the reflexive thematic analysis method, explained in section 4.5, these findings will be presented as summaries of the three themes generated from the dataset, with selected data extracts used as illustrative examples. The three themes that were generated from the dataset are titled as follows: Theme i. LEK, livelihoods and biodiversity conservation are included as interconnected and essential elements with MPAs; Theme ii. LEK is a tool that allows communities to have and regain power over marine resources through MPA management and governance; and Theme iii. Misalignment between regional and international level inclusion of LEK within MPA management.

This study found that the Pacific Island region's commitment to including LEK within MPA management has been moderately successful; overall, there are high levels of inclusion of LEK within regional level stated actions and implementation plans for

MPAs; however, there are areas where inclusion of LEK is limited. These limitations are largely due to weaker inclusion of LEK within MPAs at the international level.

## 5.2 Non-thematic contextual information for LEK

As discussed in chapter 2, LEK is a term that has several different meanings and nuances, and its practical application varies within environmental management (Aswani et al., 2018). Various terms were used to describe and reflect the inclusion of LEK within MPA management inside the dataset, such as:

- Traditional Knowledge/Traditional Ecological Knowledge,
- Cultural Knowledge,
- Cultural heritage,
- Cultural identity,
- Cultural/Traditional values,
- Cultural Services,
- Culture,
- Local Knowledge/Local Knowledge systems,
- Existing knowledge,
- Soft Technology,
- Traditional/Indigenous Technology,
- Dialogue,
- Traditional networks,
- Local information exchange,
- Knowledge sharing,
- Gender perspective/Gender life experiences/Gender values,
- Ancient truth.

The above terms provide context for how LEK has been captured within the three themes generated from this research.

### 5.3 Theme i: LEK, livelihoods and biodiversity conservation are interconnected and essential elements within MPAs

Throughout the dataset, LEK, livelihoods and biodiversity conservation were presented as fundamentally interconnected components in MPA management in the Pacific Island region. An illustration of the interconnected nature of LEK, livelihoods and biodiversity conservation can be seen in the definition of biodiversity included in the National Biodiversity Strategy and Action Plan (NBSAP) for Fiji (2017):

Conserving biodiversity is an essential part of safeguarding the biological life support systems in Fiji. All living creatures, including humans, depend on these life support systems for the necessities of life, including water, food and energy. These ecosystem goods and services are fundamental to our physical, social, cultural and economic well-being.

Ecosystem services can be further divided into four groups:

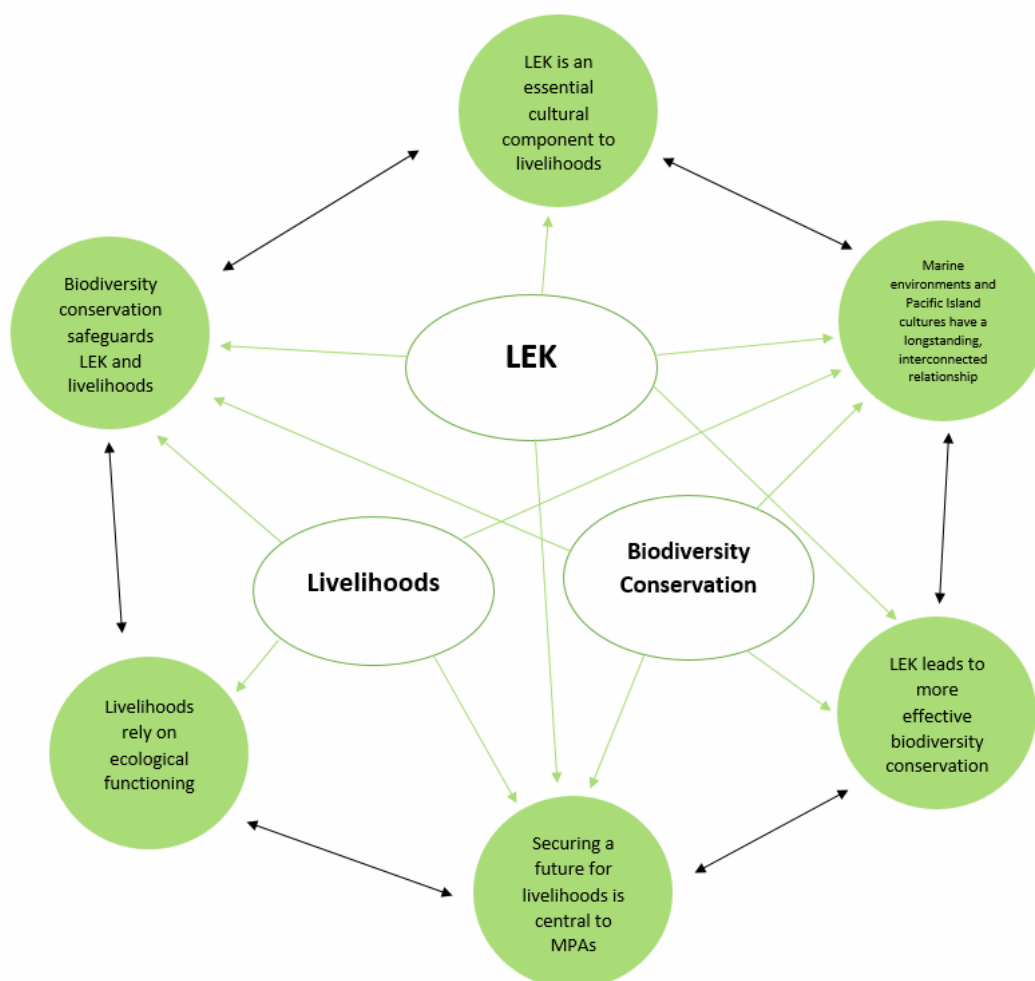
- i. Provisioning services (e.g. food, fibre, fuel, fresh water);
- ii. Cultural services (e.g. spiritual values, recreation and aesthetic values, knowledge systems);
- iii. Supporting services (e.g. primary production, habitat provision, nutrient cycling, atmospheric oxygen production, soil formation and retention); and
- iv. Regulating services (e.g. pollination, seed dispersal, climate regulation, pest and disease regulation, waste purification). (Government of Fiji, 2017, p7)

In the above extract, several codes converge to form a shared idea that LEK, livelihoods and biodiversity are fundamental to each other and interrelated. LEK and livelihoods have both been interwoven into the definition of biodiversity and what it means to conserve biodiversity. LEK is represented as an ecosystem service (cultural service) that is fundamental to supporting livelihoods. The longstanding, interconnected relationship between Pacific Island cultures and the marine environment is also captured by the inclusion of cultural services as an ecosystem service and a biological life support system for people in Fiji. Biodiversity conservation is identified as a key part of safeguarding these cultural services for the physical, social, cultural and economic well-being of people in Fiji, and livelihoods are identified

as reliant on ecological functioning within the environment. This in turn alludes to the role that biodiversity conservation has for safeguarding LEK and livelihoods.

This understanding of LEK, livelihoods and biodiversity is central to the goals, visions, aims, stated actions and implementation processes for MPAs within the regional frameworks and action plans. This inclusion of LEK as an integral component of MPA management and of livelihoods and biodiversity conservation also demonstrates that sustainable resource use and biodiversity conservation are not competing priorities for MPAs within the region. Instead, sustainable resource use and biodiversity conservation are two MPA priorities with equal importance, as each is dependent on the other. This will be demonstrated in sections 5.3.1, 5.3.2 and 5.3.3, and a visual representation of this theme can be seen in Figure 1.

Figure 1: A mind map depicting theme one, illustrating the fundamental and interconnected relationships that exist between LEK, livelihoods and biodiversity conservation within MPA management.



### 5.3.1 LEK, livelihoods and biodiversity conservation are interconnected and essential components of MPA visions, goals and aims

Visions and goals for MPAs with the Pacific Island region prioritise both sustainable resource use and biodiversity conservation, with an emphasis on protecting culture and nature simultaneously. Supporting and securing a future for livelihoods through conserving biodiversity and the ecosystem services they provide is central to all goals, visions and aims. Biodiversity is identified as a key contributor to culture, and culture as something that needs to be enhanced and secured through biodiversity

conservation. The aim is to integrate the processes for achieving this goal, engaging a range of stakeholders, which includes LEK holders. Several different terms for LEK are used within the dataset. LEK is represented as an aspect of cultural values, heritage and identity, which are noted as essential for the safeguarding of future generations in the following data extracts:

In essence the Framework for a Pacific Oceanscape is...to protect, manage, maintain and sustain the cultural and natural integrity of the ocean for our ancestors and future generations and indeed for global well-being. (Pratt & Govan, 2010, p. 54)

...the Framework for a Pacific Oceanscape has the overarching vision of: A secure future for Pacific Island Countries and Territories based on sustainable development, management and conservation of our Ocean. (Pratt & Govan, 2010, p. 56)

...Our people proudly honour, value and protect our natural and cultural heritage and cultural identity for the wellbeing of present and future generations...our cultures and traditions are widely appreciated... to protect and preserve the rich natural and cultural heritage of the Pacific islands forever for the benefit of the people of the Pacific and the world. (SPREP, 2014, p. 7)

The aim of the Revised NBSAP is to encourage, guide and coordinate an integrated national process that will engage stakeholders across sectors to achieve the holistic conservation and sustainable use of biodiversity while protecting and enhancing economic opportunity, sustainability of livelihoods, food security, culture and the environment for present and future generations. (Palau Conservation Society, 2016, p. 80)

### 5.3.2 LEK, livelihoods and biodiversity conservation are interconnected and essential components of stated actions for MPAs

LEK, livelihoods and biodiversity conservation reflected the aspirations mentioned in the section above, and built on this through the development of principles, objectives, strategic priorities and focus areas that integrate and prioritise LEK, livelihoods and biodiversity conservation within MPAs. Within the dataset, LEK is identified as a cross-sectional objective that applies to all objectives within the frameworks, including objectives pertaining to MPAs. Below are illustrative examples that demonstrate this finding:

Objective 6: Build capacity and partnerships that strengthen synergies between science, policy, local knowledge systems and indigenous sciences and enhance local and international agreements, to effectively mobilise resources to achieve Objectives 1 – 5. (SPREP, 2014, p. 8)

Objective 3: Identify, conserve, sustainably manage and restore priority sites, habitats and ecosystems, including cultural sites. (SPREP, 2014, p. 8)

Objective 1.1: Identify through scientific and traditional knowledge all areas that should be protected and managed to satisfy biodiversity conservation and resource management objectives (Palau Conservation Society, 2016, p. 18)

In the above examples, LEK is identified as a knowledge system that is needed for effective mobilisation of resources, so that all other objectives within the regional frameworks and action plans pertaining to biodiversity conservation can be effectively achieved. Objective 3 from the FNCPA is the objective pertaining specifically to MPAs within the Pacific Island region, and it calls for cultural sites to be included alongside habitats and ecosystems that have been identified as priority sites for conservation and sustainable management. This places the management of cultural identity and values connected with marine environments on the same level of importance as the conservation of marine habitats and ecosystems.

Principle 6: Managed and Protected Areas (for species protection, forest, watersheds and marine) should be comprehensive and representative... The conservation and sustainable management of Fiji's reefs lagoons and mangroves as well as its freshwater habitats are critical significance to sustaining the traditional livelihoods of the majority of Fiji's rural communities. (Government of Fiji, 2017, p. 28)

Principle 7: Improving knowledge, capacity and intellectual property... Education, public awareness and local knowledge are essential for enabling the conservation of biodiversity. (Government of Fiji, 2017, p. 29)

Reciprocal biodiversity-development mainstreaming – ensuring collaboration and partnership between biodiversity and development rather than one-way push by just one. (Government of Fiji, 2017, p. 28)

Protecting biodiversity strengthens ecosystems, the economy and culture, ultimately improving resilience to the impacts of Climate Change (Palau Conservation Society, 2016, p. 10)

Principle 2: Conservation from a Pacific Perspective

Natural resources are often the most important source of wealth and development opportunities for Pacific communities. Therefore the practice of conservation principles in



Pacific communities will influence the economic, social and cultural affairs of those communities.

International and national partners will actively recognise, respect and support:

- Community aspirations for development and wellbeing.
- A Pacific approach to conservation based on sustainable resource use, cultural heritage, traditional and cultural knowledge and expressions, and addressing food security and poverty alleviation. (SPREP, 2014, p. 10)

The above examples demonstrate that the reciprocal relationship between LEK, livelihoods and marine environments is explicitly recognised within regional framework and action plan principles. LEK and livelihoods need to be considered, respected and protected within marine biodiversity conservation, and biodiversity conservation is critical for the survival of livelihoods within the region.

The management systems developed should above all build on our strengths of knowledge and culture as oceanic peoples to ensure cost effective management that can be sustained with a maximum of self reliance. Traditional and new tools are at our disposal including processes for dialogue and action by resource owners and users, large and locally-managed marine areas, protected areas, specific species sanctuaries, as well as zone-based management and use measures for target and non-target resources. (Pratt & Govan, 2010, p. 60)

The heart of sustainable management, use and conservation of the Pacific Islands Ocean Region is translating the culture of ocean stewardship into effective management action. (Pratt & Govan, 2010, p. 60)

The above examples are taken from Strategic Priority 3 in the Framework for Pacific Oceanscape. These examples indicate that the Pacific Island region has recognised that centralising cultural knowledge and values within management systems leads to more effective management of biodiversity conservation.

### 5.3.3 LEK, livelihoods and biodiversity conservation are interconnected and essential components within implementation processes for MPAs

Like the aspirations and stated actions for MPAs, the indicators, outcomes and actions within the dataset have included LEK, livelihoods and biodiversity conservation as

interconnected and essential components for MPAs. This indicates that the region's recognition of LEK, livelihoods and biodiversity conservation as interconnected components is present throughout the MPA management documents, and that there are tangible measures for integrating LEK and livelihoods as fundamental elements for MPAs alongside biodiversity conservation. Sustainable resource use and biodiversity conservation continued to be equal priorities for MPAs, and LEK is once again identified as cross-sectional within implementation processes for MPAs. Examples of this from the data set are included below:

Improve the collection and documentation of traditional knowledge, cultural values and best practices relating to biodiversity and make readily available to support biodiversity conservation. (Government of Fiji, 2017, p. 31)

Incorporate biodiversity protection and wise use into Fiji's strategies on poverty, particularly around reduction, sustainable livelihoods. (Government of Fiji, 2017, p. 46)

Identify sites that can achieve multiple objectives and outcomes such as biodiversity, fisheries culture and heritage, sustainable tourism, to ensure they provide benefits to local people. (Government of Fiji, 2017, p. 33)

Outcome 1.1.1: Guided by a combination of scientific and traditional knowledge, a comprehensive inventory of candidate areas in need of protection will be developed by January 2017 (Palau Conservation Society, 2016, p. 13)

Monitoring Protocols: Marine protected areas (MPAs) are an important tool for conserving coral reef and other marine resources in Palau as well as the rest of the world. As a key component of nutritional, cultural and economic stability throughout Palau, marine biodiversity and ecosystems generally have established histories of monitoring and management going back to traditional conservation practices such as bul... The monitoring protocol includes both ecological and socioeconomic components. While ecological monitoring provides information on resources, socioeconomic monitoring provides information on how people are affected by protected areas... Socioeconomic monitoring provides information that can improve understanding of links between protected area management and impacts on the socio-cultural, economic and political well-being of individuals, households, communities, groups, and organizations associated with the protected areas... At larger scales, the data can be used to assess MPAs across the nation or the region. (Palau Conservation Society, 2016, p. 67-68)

This focal area is recognised as cross sectoral and as such reflected in all 7 thematic areas of the IF [Implementation Framework]. (Government of Fiji, 2017, p. 52)

The above examples show that stated actions for recognising and including LEK, livelihoods and biodiversity conservation as equal priorities within MPA management

have been translated into tangible outcomes. These include socioeconomic components to MPA monitoring protocols, an inventory for areas in need of protection that has been developed with LEK, and the incorporation of biodiversity conservation into other strategies pertaining to social issues such as poverty.

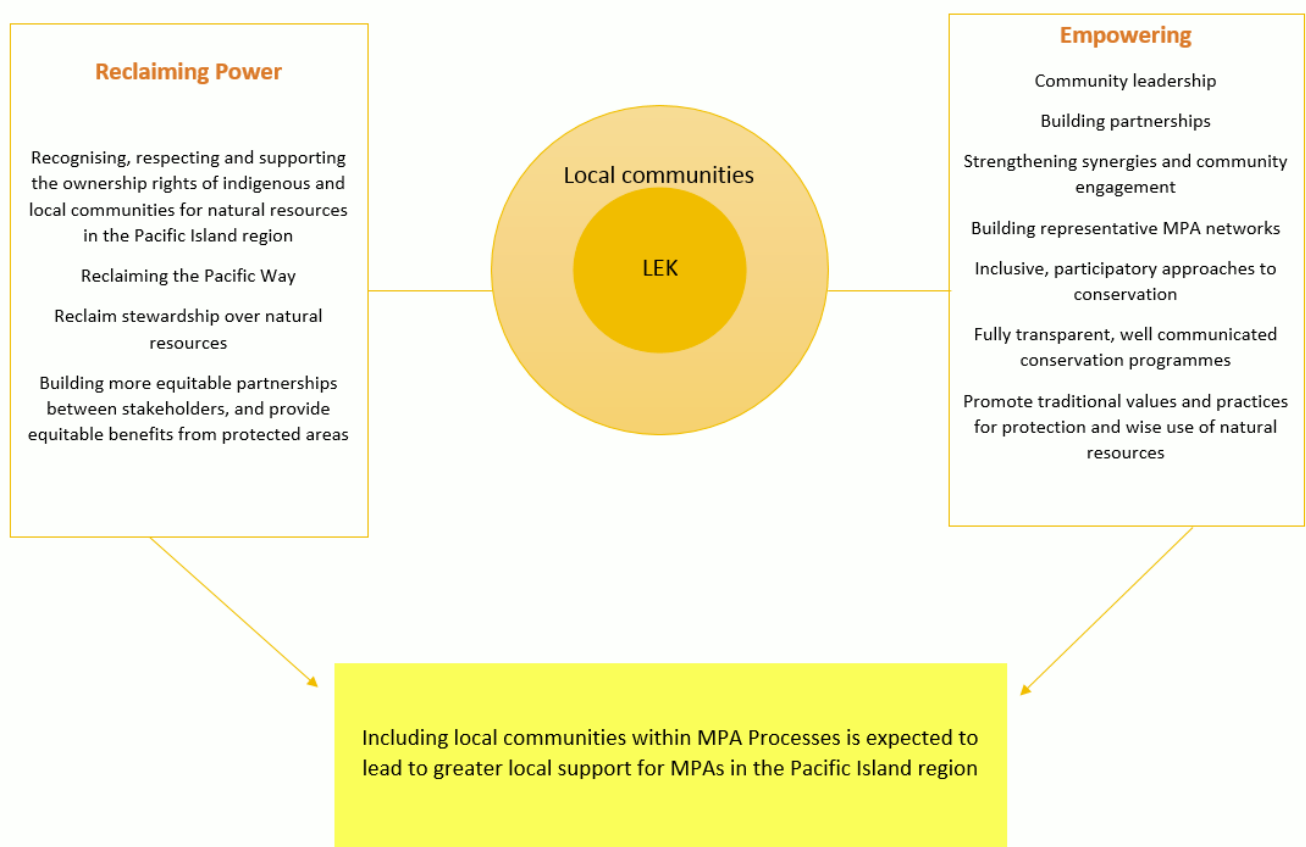
One aspect of this theme, in which LEK is recognised as an essential component of livelihoods, directly feeds into the next theme of this research, namely, LEK is a tool to empower local communities within MPA management. The key difference between these two themes is that the first captures how there is an interconnected relationship between LEK and livelihoods, while the second theme captures the delegation of power to livelihoods by including LEK within MPA management.

## 5.4 Theme ii: LEK is a tool that allows communities to have and regain influence over use of resources through MPA management and governance

Throughout the dataset, the inclusion of LEK within MPA management was presented as a way to centralise and actively involve local and Indigenous community members within the decision making process and management of MPAs within the Pacific Island region. This presented LEK as a tool to both empower and allow local and Indigenous communities to reclaim power over their marine resources, an approach to MPA management that was expected to lead to greater local support for MPAs within the region. There is an important difference between empowering and reclaiming power

within this theme; while both refer to the delegation of power to local communities, reclaiming power signifies that a shift in underlying power dynamics surrounding management of marine resources has taken place within the region. Empowerment and reclaiming of power through the inclusion of LEK will be illustrated with examples from the dataset in subsections 5.4.1 and 5.4.2, and a visual representation of theme two can be seen in Figure 2.

Figure 2: Diagram depicting theme two, illustrating that LEK is a central component to local communities that cannot be separated from them, and that the region has made efforts to both empower and return power to local communities within MPA management, which will ultimately have direct benefits for community support of MPAs.



#### 5.4.1 LEK is a tool that empowers livelihoods and local communities by actively engaging them within regional MPA management

As summarised within the previous theme, LEK is interconnected with the livelihoods and communities it exists within. The Pacific Island region builds collaborative partnerships between different stakeholders and strengthens synergies between the different knowledge systems used to inform MPA management by including LEK within the aspirations, stated actions and implementation processes for MPAs. It recognises LEK and LEK holders within communities as having a vital role in achieving effective MPA management, and in turn enables local communities to actively partake in MPA management systems. The examples below illustrate this level of inclusion of LEK and local communities.

Objective 6: Build capacity and partnerships that strengthen synergies between science, policy, local knowledge systems and indigenous sciences and enhance local and international agreements, to effectively mobilise resources to achieve Objectives 1-5 (SPREP, 2014, p. 8)

Protected areas should also be established and managed in close collaboration with, and through equitable processes that recognise and respect the rights of indigenous and local communities, and vulnerable populations. (Government of Fiji, 2017, p. 32)

Expanded national representative network of protected areas, accounting for community engagement, sustainably managed under good governance systems. (Government of Fiji, 2017, p. 33)

Action 3A -- PICTs implement integrated coastal resource management arrangements drawing on the strengths and traditions of community, district, provincial and national levels of government to achieve sustainable island life:

PICTs are increasingly demonstrating the key role their communities play in managing local resources. These efforts should be supported and coordinated at provincial and national levels to ensure enforcement and information is supplemented where necessary and that wider ecosystem and national interests can be incorporated into joint action. (Pratt & Govan, 2010, p. 60)

The above extracts illustrates that it is considered important to foster and strengthen synergies between the knowledge systems involved within MPA management (science, policy and LEK) through effective partnerships. A key element to these extracts is that the emphasis is placed on greater inclusion of local and Indigenous

communities within MPA management to improve synergies and partnerships. Local and Indigenous communities are identified as essential stakeholders within the management of local marine resources. This centralisation of local and Indigenous communities, and the acknowledgement of the important role they have, empowers local and Indigenous communities within MPA management.

#### Principle 5: Good Governance

Effective conservation programmes are inclusive, participatory, accountable and transparent. National and international partners will commit to:

- Reinforcing inclusive and participatory approaches by involving all stakeholders, particularly community representatives, when designing, implementing and assessing conservation programmes.
- Promoting and supporting cost effective scaling up and adoption of good practice conservation models through government policies.
- Developing and implementing policies which are strong and integrated across government agencies and governance levels.
- Ensuring systems are in place to enable full accountability to the people affected by [conservation] programme implementation.
- Ensuring their programmes and systems are well communicated, fully transparent and open to stakeholder scrutiny.
- Working with religious, traditional and spiritual leaders to strengthen community engagement in conservation programmes. (SPREP, 2014, p. 11)

Seeking ocean leadership based on enriching our culture further and reinforcing our identities while sharing and learning with others... We begin with what we have in common and draw inspiration from the diverse patterns that have emerged from the successes and failures in our adaptation to the influence of the sea... Resource management approaches based purely on scientific information have had limited success. There is still much to learn and share from existing knowledge and experience in managing our complex and vast coastal and ocean environment. Capacity building, including formal, tertiary and vocational training, and research needs to be more carefully targeted at addressing our governance and management requirements. Effective processes are critical for sharing information and supporting leaders and champions which will underpin the success of these strategic priorities. (Pratt & Govan, 2010, p. 61)

In the above examples, the Pacific Island region stated that ocean leadership will be based on the knowledge and identity that have been obtained through culture within the region. Sharing and learning from and with LEK needs to take place through engagement with community representatives when designing, implementing and assessing MPA management. This inclusion of LEK enables local and Indigenous

communities to be at the forefront of decision making and governance for MPAs in the region. In addition, these extracts illustrate that representative MPA networks are a priority for the region, and that achieving effective representation within MPA networks can be done through the adoption of inclusive, participatory, transparent and culturally appropriate communication approaches.

#### 5.4.2 LEK is a tool for indigenous and local communities to reclaim influence over the use and management of natural resources

Within the dataset, LEK was identified as a facilitating factor for indigenous and local communities to reclaim power over their natural resources. This is expressed through the reclaiming of ocean stewardship and the Pacific Way, a cultural process unique to the Pacific Island region which is identified as a robust approach to strengthen the capacity for regional consensus within marine management. This in turn is expected to influence international ocean priorities, decisions and actions. The following extracts taken from strategic priorities for the Framework for a Pacific Oceanscape illustrate this finding:

Putting policy into action to reclaim stewardship of the ocean as core to our Island livelihoods in a rapidly changing world. (Pratt & Govan, 2010, p.60)

Action 4B -- Influence international and regional ocean priorities, decisions and processes through reclaiming the Pacific Way and establishing a high level representation on oceans.

Establish strong and well supported networks of leaders drawn from local communities, districts and provinces through to national and regional special issues advocates, ocean champions and ambassadors to bring the ocean and related issues to centre stage at local through to global levels. PICTs have shown important progress in specific aspects of ocean and coastal management, political leaders of these countries should be supported in championing national and regional priorities in a regionally concerted way – the whole is more than the sum of its parts. (Pratt & Govan, 2010, p. 61-62)

In addition to the reclaiming of stewardship and the Pacific Way, Indigenous and local community ownership rights of natural resources and cultural knowledge are explicitly

recognised, respected and supported within MPA management. This once again placed local and Indigenous community members at the forefront of decision making and the management of marine resources and acknowledged the sense of belonging that exists between communities and the natural environment. An illustration of this can be seen in the data extracts below:

#### Principle 1: Community Rights

Most natural resources in the Pacific are owned and used by indigenous and local communities. International and national partners will actively recognise, respect and support:

Community property rights including traditional rights over natural resources, indigenous intellectual property relating to natural resources and cultural knowledge.

Community decision-making practices. Community rights to design, prioritise, conduct and publish research.

Community rights to access information available on their resources, natural and cultural heritage and society in appropriate forms and language.

Community rights to develop opportunities that support and sustain local livelihoods and wellbeing. (SPREP, 2014, p. 9)

The Principle calls on national partners and stakeholders to actively recognise, respect and support:

- Community property rights including traditional rights over natural resources, indigenous intellectual property rights relating to natural resources and cultural knowledge.
- Community decision-making structures and practices, while ensuring gender inclusivity in decision-making. (Government of Fiji, 2017, p. 27)

Emphasising these rights within the MPA frameworks and action plans determined a pathway for returning power to indigenous and local communities within MPAs in the region. An aspect of this theme is the relationship that exists between international, regional and local levels, particularly regarding the influence that the region can have on international priorities, decisions and actions. The next theme explores the dynamic between regional and international level MPA management further, with particular focus on which international level processes and documents the region intends to influence and feed their regional MPA commitments into, and on how well aligned



international and regional approaches are when it comes to including LEK within MPA management.

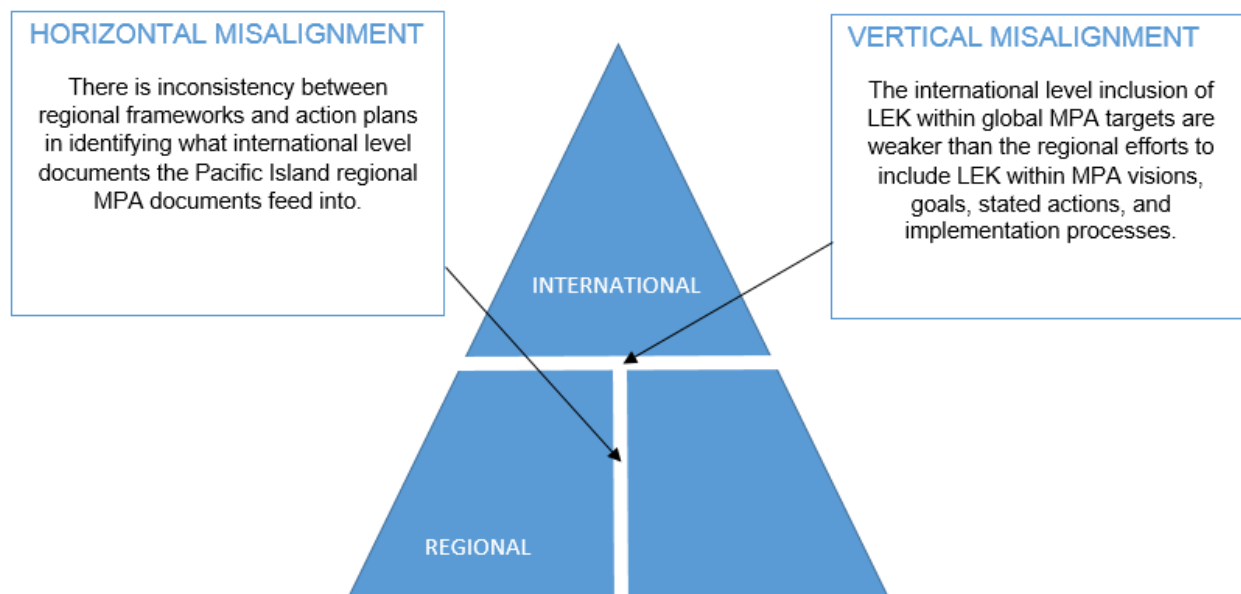
## 5.5 Theme iii: Misalignment between regional and international level inclusion of LEK within MPA management

This research found a discrepancy between regional and international level inclusion of LEK within MPA management. This was identified within the dataset as an inconsistency in signaling where regional MPA documents fed into at the international level (horizontal misalignment), and also through the identification of weaker integration of LEK within the global MPA targets that were incorporated into regional MPA documents (vertical misalignment).

Horizontal misalignment refers to a lack of coordinated efforts across a single management hierarchy to achieve a management goal, which in this research was identified at the regional level. There are discrepancies between the Pacific Island regional frameworks and action plans regarding the identification of where regional efforts transfer into on an international level.

Vertical misalignment, which refers to a lack of coordinated efforts across multiple management hierarchies, was identified between regional and international level MPA management. Regional level targets and their inclusion of LEK misaligned with international level targets and their inclusion of LEK within the dataset. This horizontal and vertical misalignment between regional and international levels will be presented in subsections 5.5.1 and 5.5.2, and a visual representation of theme three can be seen in Figure 3.

Figure 3: Diagram depicting theme three, illustrating the horizontal and vertical misalignment that exists as an inconsistency between regional MPA commitments, and as a misalignment between regional and international commitments for LEK within MPA management.



### 5.5.1 Horizontal misalignment

Within the dataset, an inconsistency between how and where regional MPA documents transfer into international MPA documents was identified. While some of the regional documents explicitly stated what international organisations, documents and agreements their regional efforts for MPA management were feeding into, others did not. An example of this discrepancy can be seen in the two data extracts below, the first taken from the Framework for a Pacific Oceanscape, and the second taken from the FNCPA.

We need to build appropriate frameworks that provide the best chances of successfully managing our resources in an integrated and sustainable way, drawing on our heritage and more recent best practices, standards and limits set by our communities and leaders, and international bodies. (Pratt & Govan, 2010, p. 58)

The region, their oceanic resources and ecosystems provides a bank of critical environmental services underpinning the health of the planet. The health of our ocean must be acknowledged as a significant global economic, social and environmental contribution. Therefore support from the global community to strengthen the capacity of PICTs to sustainably manage the ocean must be seen as an ongoing global investment. (Pratt & Govan, 2010, p. 63)

This framework provides guidance to Pacific Island countries and territories (PICTs), regional organisations, NGOs, the international donor community and partners working together to achieve the global 2020 Aichi Biodiversity Targets of the Convention on Biological Diversity (CBD) through the implementation of National Biodiversity Strategies and Action Plans (NBSAPs). (SPREP, 2014, p. 5)

The first two data extracts detailed above illustrate how international level organisations, standards and agreements are described throughout the Framework for a Pacific Oceanscape. International bodies, practices, standards and agreements are identified as playing a critical and supportive role in regional efforts to strengthen and improve capacity to include LEK and LEK holders within regional MPA management and governance. However, there is no specific reference to which international bodies, agreements, practices and standards are important for achieving this within the Framework for a Pacific Oceanscape. In comparison, the 2020 Aichi Biodiversity Targets and the Convention on Biological Diversity (CBD) were explicitly referenced throughout the FNCPA as the international level agreements and targets that regional level efforts transfer into. This discrepancy between the Framework for a Pacific Oceanscape and the FNCPA indicated that a horizontal misalignment exists between the documents regarding their international transferability. Of the regional documents within the dataset that did identify relevant international level documents and agreements, a misalignment was identified between regional efforts to include LEK and international efforts to include LEK within MPA management. More specifically, this was between global MPA targets included within the Aichi Biodiversity Targets and regional targets, stated actions and implementation plans for MPAs.

### 5.5.2 Vertical misalignment

Discrepancies also exist between regional efforts to include LEK within MPA management and international efforts to include LEK within MPA management, indicating a vertical misalignment between international and regional level documents and agreements for MPAs. Below is an example of this discrepancy within the NBSAP for Fiji:

Focus Area 2: Developing Protected Areas (PA)

CBD Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.

Aichi Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.

Fiji Marine Target: (a) By 2020, at least 30% of Fiji's offshore areas is effectively managed and part of a national marine protected area network; and (b) By 2020, 100% of inshore traditional fishing grounds (iQoliqoli) are effectively managed within locally managed areas. (Government of Fiji, 2017, p. 32)

The above extract illustrates strong inclusion of LEK within regional level targets for MPAs and weaker inclusion of LEK within international level targets for MPAs. The Fiji Marine Target included a partial target for locally managed marine areas (LMMAs) and iQoliqoli, which directly included LEK and LEK holders within marine management. The Aichi Target, however, stated that MPAs must be effectively and equitably managed, which merely suggests that local and Indigenous communities should be included within marine management but does not make any explicit statement to that effect. The CBD Strategic Goal for MPAs included within this extract does not reference LEK. This indicates a vertical misalignment between regional and global efforts for including LEK within MPA targets.

Another example of this vertical misalignment can be seen in the FNCPA. This framework included a set of regional objectives and adopted the Aichi Biodiversity Targets as regional indicators for success to realise these objectives and improve accountability:

Without agreed targets, measurement of progress against the objectives has been difficult in the past and mainly anecdotal. To help overcome this and improve the accountability of the Framework [for Nature Conservation and Protected Areas], the 2020 Aichi Biodiversity Targets of the Convention on Biological Diversity have been adopted as the basis for indicators for the Framework. (SPREP, 2014, p. 14).

The FNCPA included an objective that called for the integration of LEK and LEK holders within all aspects of regional biodiversity and resource management, including MPAs. This objective is presented in the following data extract:

Objective 6: Build capacity and partnerships that strengthen synergies between science, policy, local knowledge systems and indigenous sciences and enhance local and international agreements, to effectively mobilise resources to achieve Objectives 1 – 5. (SPREP, 2014, p. 8)

This strong inclusion of LEK as a cross-sectoral objective for biodiversity and resource management within the region is, however, weakened once the objective is matched up with the regional indicators (Aichi Biodiversity Targets). Of the 32 targets and indicators included within the FNCPA, only 12 mention LEK and/or LEK holders, despite LEK being recognised as a cross-sectoral objective. This discrepancy can be attributed to the fact that only two of the 20 Aichi Biodiversity Targets include LEK:

Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable. (SPREP, 2014, p. 16)

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. (SPREP, 2014, p. 18)

Since the Aichi Biodiversity Targets do not reference LEK, the Pacific Region will have to domesticate the Targets in a way that reflects the region's holistic and integrated worldview, and scientific systems, including a set of locally meaningful indicators. The Aichi Biodiversity Targets as they stand are therefore limiting the international efforts to include LEK and Indigenous knowledge systems within MPA management. As the Pacific Island region uses the Aichi Biodiversity Targets as regional indicators for success within its frameworks and strategies for MPAs, it also limits the Pacific Island region's holistic approach to include LEK and LEK holders within all aspects of biodiversity and resource management. This presents a vertical misalignment and a lack of vertical cohesion between regional and international levels for the inclusion of LEK within MPA management.

## 5.6 Conclusion

This chapter presented the results of the reflexive thematic analysis that examined how LEK has been included in MPA management in the Pacific Island region. The results revealed that the Pacific Island region has included LEK as a knowledge system that is interconnected and essential to livelihoods and biodiversity conservation, and as a central and integral component of MPA management and governance. Importantly, an emphasis was placed not just on the inclusion of LEK, but also on the inclusion of LEK holders and local communities as vital stakeholders for MPA decision making, implementation and monitoring. This empowered and

allowed local and Indigenous communities to reclaim power through the centralisation of cultural knowledge, values, identity and practices within MPA management and governance.

The results also revealed discrepancies that exist within regional MPA documents regarding the signaling of international bodies, agreements and documents that the regional documents feed into, as well as a disconnection between regional efforts and international efforts to include LEK within MPA targets. It will be critically important for the region to address these discrepancies within their regional MPA documents, as they currently limit the region's ability to fully realise their aspirations and actions to centralise LEK and LEK holders within MPA management and governance. These findings, their implications and how they are situated within the literature and answer the research objectives will be discussed in detail in the next chapter.

## 6. DISCUSSION

### 6.1 Introduction

This research drew on data collected from Pacific Island regional frameworks and action plans for ocean and biodiversity management, as well as the researcher's critical reflection, to understand how Local Ecological Knowledge (LEK) has been included in Marine Protected Area (MPA) management in the Pacific Island region. The regional aims, goals, objectives, targets, focus areas, actions and implementation processes for MPAs were examined under a reflexive thematic analysis guided by three research objectives. As a result, three distinct themes were generated from the data, yielding important information on how LEK is understood and acknowledged within regional MPA management and how this supports and enables local community involvement within systematic marine conservation, and also revealing specific areas where the inclusion of LEK could be further enhanced to support successful translation of MPA design and planning into action.

This discussion chapter integrates the main research findings and the researcher's critical reflections to understand the implications of the study outcomes for regional MPA management and presents how this is relevant to the body of literature on marine management, socio-ecological perspectives and ecological knowledge systems. This chapter highlights how this research advances the understanding of what inclusive MPA management involves, within a region that is highly diverse in culture, development and ecology and is also extremely vulnerable to the impacts of global environmental issues such as the biodiversity and climate crisis. It reflects on the globally critical importance of recognising, integrating and supporting LEK holders



within MPA management and governance. This chapter concludes with remarks on the opportunities for both regional and international level organisations to strengthen the inclusion of LEK within MPA management.

## 6.2 How is LEK described within MPA management?

The first research objective of this study was to identify how LEK has been described within regional frameworks and action plans. This research found that LEK was expressed within the dataset in a range of different terms that alluded to it being a knowledge system that is dynamic, longstanding and specific to the cultures it exists within. In addition, it is understood and included within MPA management as a knowledge system that is tightly bound within socio-ecological relationships. This understanding of LEK is expressed through an entanglement of LEK, livelihoods and biodiversity conservation within the goals, stated actions and implementation plans for MPAs. This finding, its implications, and how it is situated within the field of literature will be discussed in the sections below.

### 6.2.1 LEK is a dynamic, longstanding, culturally embedded knowledge system

This research found that LEK was described within the dataset as a number of different terms. Some examples of these various terms include cultural knowledge, cultural values, cultural services and practices, traditional knowledge, and traditional/Indigenous technology. This finding supports conclusions made by several other researchers that LEK is widely recognised as synonymous with a variety of terms that often reflect culture, community, traditional, and indigenous knowledge (Gilchrist

et al., 2005; Davis & Wagner, 2003; Ban et al., 2018; Aswani et al., 2018). Aswani et al. (2018) noted that LEK is likely to be expressed in terms that typically refer to the understandings, beliefs, values and practices that have been built over time, and belong to a specific location and/or culture. Davis and Wagner (2003) concluded that understanding LEK as a dynamic phenomenon that has a range of meanings and nuances allows researchers to gain deeper insight of how LEK operates within cultural, social, spiritual and political contexts. Ban et al. (2018) stated that indigenous knowledge is indivisible from cultural, social and political organisation, and that intricate, place-based knowledge of land and water is often transferred through oral traditions.

These descriptions of LEK depict it as a knowledge system that is nested within culture. This research supports this depiction of LEK, and claims made by Charnley et al. (2007) and Du Plessis and Fairbairn-Dunlop (2009) who collectively suggest that LEK is dynamic information that is passed down generations through cultural transmission, and that cultural practices, beliefs, and values are all forms of LEK that are more or less integrated with each other. Du Plessis and Fairbairn-Dunlop (2009) stated that the production, preservation, exchange, and use of LEK is deeply rooted within the culture and spiritual values, practices, and heritage of local communities and indigenous people. This study findings also supports research by Du Plessis and Fairbairn-Dunlop (2009) and Forsyth (2011) who concluded that LEK cannot be separated from the cultural norms that regulate it, and that it must reflect regional frameworks and legislation for the Pacific Island region.

### 6.2.2 LEK is an integral component of socio-ecological relationships

Building on the understanding of LEK as dynamic, longstanding, and embedded within culture, this research also found that LEK and livelihoods were described as entangled with biodiversity throughout the dataset. An illustrative example of this can be seen in the definition of biodiversity included within Fiji's National Biodiversity Strategy and Action Plan, where LEK was identified as fundamental for the survival of livelihoods, and essential for effective conservation of biodiversity. In addition, the survival of LEK was identified as dependent upon the survival and well-being of livelihoods, and of biodiversity conservation. This entanglement was depicted throughout the goals and visions, stated actions, and implementation processes for regional MPAs. It presented LEK as an essential component to the socio-ecological relationship that exists between communities and marine ecosystems.

The literature has increasingly recognised and documented the interdependence of socio-ecological relationships, and its importance to natural resource management (Ban et al., 2011; Johannes et al., 2000; Cinner et al., 2016). Many researchers have concluded that human dimensions must be considered within the design and management of marine resources (Ban et al., 2011; Fernandes et al., 2012; McLeod et al., 2009; White et al., 2014). Ban et al. (2011) argued that tackling natural resource management from a socio-ecological systems perspective is critical for coral reef ecosystems in developing nations, where reliance on marine resources for subsistence is high, and scientific information used to inform MPA design and management has typically come from developed nations and therefore may be disconnected from the social and cultural factors that influence ecological functioning. Incorporating MPAs into broader social values means that MPAs are

moving away from simply prioritising biodiversity conservation, and instead aligning with community interests and values for ecosystem goods and services, an approach where biodiversity conservation may be a co-benefit rather than a primary goal (Ban et al., 2018). The findings from this research support this claim, particularly with the finding that livelihoods are centralised within MPA management, and that Locally Managed Marine Area (LMMA) stated actions and implementation plans are incorporated into the regional MPA management stated actions and implementation plans.

Researchers such as Forsyth (2011), Du Plessis and Fairbairn-Dunlop (2009) and Ban et al. (2011) highlighted that several challenges exist for transferring LEK into regional policies and frameworks, and also from MPA design into action. One challenge pertains to the existence of broader cultural sensitivities surrounding the use and dissemination of LEK. This is particularly true for several Pacific cultures where LEK is only held by certain members of society, such as leaders, elders, or men (Forsyth, 2011). In some cultures, the value of LEK is inversely related to the number of people that have access to it, and so access to LEK may be limited (Du Plessis & Fairbairn-Dunlop, 2009). These challenges cement the importance of understanding LEK as indivisible from culture within regional MPA management, and these findings build on this research by identifying the Pacific Island region's approach to recognising LEK and livelihoods as inseparable and placing livelihoods at the centre of MPA management processes. Upon reflection, the more appropriate question to ask is not how is LEK included within regional MPA management, but instead, how are LEK holders included within regional MPA management?

## 6.3 Is LEK an enabler within MPA management?

The second objective for this research project was to identify if LEK is an enabler within MPA management in the Pacific Island region. This study found that the Pacific Island region has empowered and recognised ownership rights for local and indigenous communities through the inclusion of LEK and LEK holders within regional MPA management. The regional frameworks and action plans have centralised LEK and LEK holders in several ways that are empowering for local communities, and also allow local communities to reclaim power over their marine resources. This shows that LEK enables local communities to be involved within areas of marine resource management and governance where they have previously been excluded. This finding, its implications, and how it builds on literature and supports conclusions made by other researchers will be discussed in the sections below.

### 6.3.1 Empowerment and recognition for indigenous and local community ownership rights

The stated actions and implementation plans consistently prioritised the inclusion of LEK holders as leaders within MPA management, and recognised that including LEK holders would assist in building synergies between different knowledge systems, as well as strengthen partnerships between stakeholders. In addition, the use of culturally appropriate community engagement and communication tools are prioritised within MPA management, such as the use of dialogue to engage within communities regarding MPAs in their local vicinity. By directly including LEK and LEK holders within MPA governance and management, the Pacific Island region has not only empowered local communities to be involved in the design and planning processes of MPAs, but also within the distribution of information across the region.

A strong emphasis within the dataset was placed on local and indigenous communities reclaiming power over marine resources within the regional frameworks and action plans. Stated actions and implementation plans noted that including LEK and LEK holders within positions of power in MPA management allowed local and indigenous communities to reclaim environmental stewardship, and also gain recognition and respect for ownership rights associated with marine resources.

Several researchers have highlighted problematic power dynamics within MPA management and stakeholders, and have identified MPAs as an inherently top-down conservation model that historically prioritised the protection of ecological processes above all else, often at the expense of resource users (Ban et al., 2011; Ban et al. 2018; Anbleyth-Evans & Lacy, 2019; Cinner et al., 2011). Top-down approaches to MPA management have focused on restoring marine ecosystems to a pristine state, which required no human influence or interaction (Cinner et al., 2011). This excluded local communities from accessing resources vital for providing ecosystem goods and services. These approaches have received criticism in recent decades for incorporating a simplistic understanding of socio-ecological dynamics, isolating local communities from decision-making processes on important resources, and contributing to community mistrust in MPA scientists, managers, NGOs, and consultants (Cinner et al., 2011; Anbleyth-Evans & Lacy, 2019; Ban et al., 2011; Hepi et al., 2018).

This study found that incorporating LEK holders as leaders within MPA governance and management is a way for local communities to reclaim power over resources. MPA management over the last decade has shifted towards merging top-down and

bottom-up approaches to MPA management, a trend associated with increased understandings of complex socio-ecological relationships within marine environments, and also increased recognition and support for the global Indigenous rights movement (Cinner et al., 2011; Ban et al., 2018; Ban et al., 2011). This has been particularly prevalent within coral reef ecosystems, which are largely located within developing nations, and play an important role in providing ecosystem goods and services for communities (Ban et al., 2011; Fernandes et al., 2012; McLeod et al., 2009; White et al., 2014).

Several researchers that have identified key biophysical principles that should be incorporated into MPAs established for coral reef ecosystems have also concluded that it is critically important for LEK and local communities to be considered within the decision-making process for MPAs (Fernandes et al., 2012; McLeod et al., 2009; White et al., 2014). The findings from this research support these conclusions.

This research also found that the regional MPA frameworks and action plans recognised bottom-up approaches as valuable to MPA management, by including traditional marine management approaches and the LMMA network within MPA targets, objectives and action plans for the Pacific Island region. Research has shown that integrating bottom-up approaches into conservation planning through the integration LEK and LEK holders has many benefits, including increased success and cost-effectiveness of conservation programmes, and successful integration of traditional and local knowledge into the decision-making process (Tawake et al., 2001; Veitayaki et al., 2004; Danielsen et al., 2014; Waylen et al., 2010).

Several researchers have also highlighted the success of bottom-up approaches for protecting coral reef ecosystems (Cinner et al., 2016; Jupiter & Egli, 2011; Govan, 2009a). Cinner et al. (2016) concluded that many healthy coral reef ecosystems exist within the Pacific Island region where there is strong local involvement in their management, respected local ownership rights, and traditional management practices. Cinner et al. (2016) described these locations as 'bright spots', coral reef ecosystems that are not necessarily pristine, but are defying expectations with fish populations.

While there has been a positive trend taking place for integrating LEK and LEK holders within MPA management across the globe, there are still challenges for LEK holders working within what is an inherently top-down conservation model (Ban et al., 2011; Ban et al., 2018). These challenges include the failure to integrate LEK holders during all stages of MPA management, and the fact that final decision-making powers often lie with government ministers (Ban et al., 2018; Dick et al., 2012; Nursey-Bray & Jacobson, 2014; Von der Porten et al., 2016). Nursey-Bray and Jacobsen (2014) noted that these challenges exist for Canadian First Nation people and that final decision-making authorities lying only with government ministers was inadequate and undermined other efforts to include Indigenous peoples within environmental management. In addition, the integration of Indigenous peoples within MPA governance and management is a field of literature that has received little attention, and it has been identified as a field that requires additional research to ensure that dual goals within MPA management are being adequately addressed (Ban et al., 2018).



The findings from this research within the Pacific Island region build on this literature by providing an example of LEK holders being empowered within all stages of MPA management. LEK was identified as a cross-sectional objective that pertains to all the stated actions and implementation plans within the regional frameworks and actions plans, including those pertaining to MPAs. This shows that not only is the Pacific Island region following global trends of merging top-down and bottom-up approaches to MPA management, it has also overcome some of the challenges associated with integrating LEK and LEK holders into MPAs. This finding strengthens the inclusion within the region, and suggests that the Pacific Island region is not only a leader in ocean management, but also the integration of LEK holders within MPA management.

### 6.3.2 Community engagement and centralisation leads to more effective MPA management

This research found that delegating power to local communities is expected to increase the support for and compliance surrounding MPAs within the Pacific Island region. This finding supports several studies that have identified that empowering LEK holders and local communities within MPA management has been widely reported as a critical factor for MPA success (Ban et al., 2011; Anbleyth-Evans & Lacy, 2019; Hepi et al., 2018; Fernandes et al., 2012; McLeod et al., 2009; White et al., 2014). The presence of LEK and LEK holders within conservation programmes can increase a sense of ownership over natural resources and within conservation initiatives for local and Indigenous communities and lead to greater community involvement in management activities, including monitoring and enforcement (Veitayaki et al., 2004; Von der Porten et al., 2019).

This research also found that by delegating power to local and indigenous communities within MPA management, the Pacific Island region aimed to regain trust and further support from local communities for MPAs. Gaining support for natural resource management from local communities is identified as critical by several researchers (Ban et al., 2011; Kenchington & Bleakley, 1994; Sulu et al., 2015). Communities that do not support MPAs are often unwilling to cooperate with MPA regulations, which can lead to their demise (Ban et al., 2011).

Building the trust of local and Indigenous communities takes time, particularly when that trust has been damaged. Due to the typically top-down nature of MPAs and the challenges that still persist with fully including indigenous communities within governance and management, Indigenous and local communities that have had negative experiences with scientists and MPA managers still show levels of distrust of marine resource management (Anbleyth-Evans & Lacy, 2019; Ban et al., 2018). It is therefore critically important that local and indigenous communities are included with respect and integrity during all stages of MPA management so that MPAs can thrive.

## 6.4 How will LEK assist the Pacific Island region in achieving global MPA targets?

The third objective for this research was to identify how the inclusion of LEK will assist the Pacific Island region to achieve global targets for MPAs, which have been set out under the Convention on Biological Diversity's (CBD) Aichi Biodiversity Targets and the United Nations' Sustainable Development Goals (SDGs). Aichi Biodiversity Target 11 called for 10% of coastal and marine areas to be equitably and effectively managed through protected areas or other effective area-based conservation measures by 2020. SDG Target 14.5 called for the protection of at least 10% of marine and coastal

areas, consistent with national and international law and based on the best available scientific information. The Pacific Island region has committed to achieving these targets.

This research found that a horizontal misalignment and vertical misalignment exists between the regional inclusion of LEK within MPA management and international inclusion of LEK within MPA management. There are discrepancies between the Pacific Island regional frameworks and action plans regarding the identification of where regional efforts transfer into on an international level. There is also a discrepancy between regional level inclusion of LEK and international level inclusion of LEK within MPA management. . These findings, their implications and how they are situated within the literature will be discussed in the sections below.

#### 6.4.1 Discrepancies within regional level MPA stated actions due to international level limitations

This research found that there were marked differences between the regional frameworks and action plans in identifying which international documents or agreements the regional documents were feeding into. This revealed discrepancies between how and where regional efforts transfer into international efforts. A clear example of this can be seen when comparing the Framework for Nature Conservation and Protected Areas (FNCPA) and the Pacific Oceanscape. The FNCPA repeatedly referenced the CBD's Aichi Targets and SDGs within its goals, objectives and indicators for success, and explicitly stated that the Aichi Targets are used as a framework for regional objectives and indicators for MPAs within the region. This signalled a strong vertical alignment between regional and international levels. The Pacific Oceanscape, however, included references to international level documents

and global agreements within its objectives, principles and actions, but did not specify which international level documents or global agreements it plans to align with. In addition, the Pacific Oceanscape highlighted the importance of cohesion on all scales (international, regional, national and local) for successfully achieving good governance of natural resources. Policy alignment on all scales has been identified as a central and global challenge within biodiversity conservation and management (Zinngrebe, 2018). While the Pacific Island region has gone some way to successfully identifying which international level frameworks and agreements it aligns itself with for MPA management, the discrepancy that exists between regional frameworks and action plans highlighted that there is opportunity for the region to improve its horizontal alignment. Ultimately, addressing this discrepancy would strengthen the region's ability to align with international level frameworks and agreements.

#### 6.4.2 Misalignment between global targets for MPAs and regional targets and objectives for MPAs

This research also found that when global targets were specifically included within the dataset, there was a disconnection between how the region had included LEK within its stated actions for MPAs, and how LEK had been included within global MPA targets. An example of this can be seen in the FNCPA, which has used the Aichi Biodiversity Targets as a framework. The FNCPA identified the inclusion of LEK and LEK holders as a cross-sectoral objective for all matters pertaining to biodiversity (including MPAs) and recognised Indigenous ownership rights of land, water, knowledge and conservation programmes within its code of conduct principles. However, the targets for realising these objectives and principles failed to include LEK to the same degree. Despite the fact that including LEK was a cross-sectoral objective

for all areas of biodiversity, consideration of LEK and LEK holders is only included in 12 out of 32 targets and indicators within the FNCPA. This finding could be attributed to the fact that the FNCPA directly transferred Aichi Biodiversity Targets into the regional framework and that the Aichi Biodiversity Targets have not thoroughly referenced the inclusion of LEK and LEK holders as a cross-sectoral objective within targets.

This finding supports the conclusions of several researchers regarding the challenge of achieving cohesion within vertical policy alignment. Cohesion is the unity in principles of policies and regulations and reductions in ambiguity and fragmentation so that higher levels of effectiveness can be achieved (Pokwana & Kyobe, 2016). A lack of cohesion within environmental policies has been reported by several researchers, including weak synergies between national level and international level climate and energy policies across the globe (Pittcock, 2011; Gomar et al., 2016; Gelcich et al., 2018).

In the case of this study's findings, ambiguous international targets with weaker considerations of LEK have limited the region's ability to fully realise its aspirations for including LEK and LEK holders within MPA management, thus leading to a lack of cohesion between regional and international efforts to include LEK. This is not to say that international level organisations have failed to recognise the importance of including LEK and LEK holders within environmental management. The international community has called for the inclusion of LEK and LEK holders within environmental management at the highest level of global environmental governance (United Nations Environmental Programme, 2019b; United Nations Environmental Programme, 2019a). However, when considering the IUCN's global standards for MPAs, strict

guidance on what can be considered a priority within MPAs also pointed towards persistent challenges for LEK and LEK holders within MPA management at the international level. IUCN global standards have stated that biodiversity conservation needs to be identified as the primary objective and priority for a marine area to be considered an MPA (Dudley, 2008; Day et al., 2019). This applies to marine areas that have dual objectives and priorities, such as sustainable resource use and biodiversity conservation. In this case, the IUCN have stated that when a conflict arises, biodiversity conservation must be prioritised above all else (Day et al., 2019).

This international level approach to defining MPAs is problematic as the inclusion of LEK and LEK holders within MPA management requires the recognition of complex socio-ecological relationships and the safeguarding of marine resources for subsistence and livelihoods. Researchers have identified that the Pacific Island region has a high number of traditional marine managed areas and a growing LMMA network which cannot be included as part of their regional contributions to global MPA targets laid out by the CBD and UN. This indicated that top-down management of MPA still persists at the highest level and supports conclusions reached by Vierros et al. (2010), who stated that marine areas such as ICCAs and LMMAs which contribute to biodiversity within the Pacific Island region are underrepresented within global MPA databases, indicating that global MPA databases are either incomplete or fail to fully recognise the contribution of bottom-up marine management areas to biodiversity conservation.

One reason why the international community might call for the integration of LEK within environmental management but fail to adequately address that within MPA global standards, could be related to the fact that LEK is difficult to define, and is best

understood as a concept that has a combination of attributes which include it being dynamic, longstanding, location-specific, entangled with culture, livelihoods and the natural environment and indivisible from the holder (Aswani et al., Gilchrist et al., 2005; Davis & Wagner, 2003). Several researchers have noted that using explicit definitions of terminology within environmental management is crucial for its robust integration into legislation and policy (Roos & Zaun, 2014; Dhliwayo et al., 2009). This further supports a reflection previously made in section 5.2.2, that the focus should be placed on including LEK holders within MPA management, rather than simply including LEK within MPA management. Shifting the focus away from the knowledge system on its own and towards the indigenous and local people who hold the knowledge may provide the international community with a greater understanding of the perspectives of LEK holders, and therefore improve how this knowledge is transferred into global standards and global targets for MPAs.

Improving this understanding within the international community will be critical in the years to come, particularly as the world continues to favour the designation of large-scale MPAs to achieve global MPA targets and protect biodiversity. The Pacific Island region is home to the world's largest ocean and to highly productive and abundant coral reef ecosystems that are extremely vulnerable to climate change and need to be protected with the most effective marine management approaches. As the Pacific Island region has strongly included LEK holders within its regional MPA management, it should challenge international level organisations about their failure to do the same in their global standards and global targets for MPAs.

## 6.5 Conclusion

The aim of this chapter was to discuss the research findings and how they contribute to advancing the understanding of the inclusion of LEK within MPA management in the Pacific Island region. This research found that the Pacific Island region has adopted and integrated an understanding of LEK as dynamic, longstanding, embedded within culture and entangled with livelihoods and biodiversity. It also found that including LEK within the regional frameworks and actions plans for MPAs enables indigenous and local communities (LEK holders) to be empowered within the decision-making process, and also to have recognition of ownership rights for water, land and information respected at a regional environmental governance level. However, discrepancies between regional-level efforts to include LEK and misalignment with international level agreements and targets pertaining to MPAs have limited the region's ability to fully actualise their aspirations for strong inclusion of LEK within MPA management.

Exploration of the implications of the results of this study suggested that LEK is complex and cannot be defined as a single term or phenomenon, which has highlighted the importance of understanding the cultural and social factors that carry and share LEK, as well as the important role that LEK holders have in transferring LEK within biodiversity policy. Global standards for MPAs have so far maintained a top-down approach to MPA management, which has undervalued the Pacific Island region's efforts to equitably conserve biodiversity in the Pacific Ocean as well as the region's contributions to global MPA targets. This points to the need for international level organisations to understand LEK from a socio-ecological perspective and as a knowledge system that is indivisible from the holder, as well as the interconnectedness



of the international, regional and local scale for achieving robust inclusion of LEK within MPA management.

## 7. CONCLUSION AND RECOMMENDATIONS

### 7.1 Introduction

The Pacific Island region is home to several countries and territories that are members of international environmental organisations including the IUCN and the CBD, which provide members with support and guidelines for implementing Marine Protected Areas (MPAs) (Marine Conservation Institute, 2020; Day et al., 2019; Dudley, 2008). Further to this, the CBD Aichi Biodiversity Targets and the UN's Sustainable Development Goals (SDGs) called for 10% MPA coverage of the global ocean by 2020, with a further target of 30% MPA coverage by 2030 supported by the scientific community (CBD, 2010; Sustainable Development Knowledge Platform, 2019; MPA News 2016; Lubchenco, & Grorud-Colvert, 2015).

As the global community works towards designating and implementing more MPAs to meet global MPA targets, it is critical that the planning, decision making, governance and managing of MPAs are effective. The IUCN has identified that MPA management around the globe needs great improvement, including more appropriate integration of Local Ecological Knowledge (LEK) and local communities. Many other international environmental organisations have called for appropriate and successful integration of local and Indigenous communities within environmental management, including recently during the closing statements from both the Indigenous People's Major Group and the Science and Technology Major Group at the fourth session of the United Nations Environmental Assembly (UNEA 4) (United Nations Environmental Programme, 2019a; United Nations Environmental Programme, 2019b).

This study responded to these concerns through an examination of how Local Ecological Knowledge (LEK) has been included within MPA management in the Pacific Island region. This aim was further supported by three research objectives, that focused the examination on how LEK was described within the regional MPA management, whether LEK was an enabler within MPA management and whether including LEK would assist the Pacific Island region in meeting global MPA targets set out under the CBD's Aichi Biodiversity Targets and the SDGs. Data was drawn from the Pacific Island region's frameworks and action plans pertaining to MPA management which alongside the researcher's critical reflections, has led to several conclusions that can help the Pacific Island region and the international community understand how to effectively and appropriately include LEK and local and Indigenous communities within MPA management. These conclusions will be explained in detail in the following sections, which will be followed by four recommendations for further research, the Pacific Island region, and the international community.

## 7.2 From LEK to LEK holders

This research examined how LEK was described within regional MPA frameworks and action plans, and if LEK was an enabler for local and Indigenous communities within regional MPA management. A key finding from this research was that LEK was recognised as inseparable from LEK holders and therefore, strong inclusion of LEK within Pacific Island regional MPA management also enabled LEK holders to be valued leaders and stakeholders. At the beginning of this research, LEK was identified as a knowledge system that has various meanings and nuances, and as location-specific and culturally unique. The Pacific Island region understood LEK from a socio-ecological perspective and included LEK as a knowledge system that is tied to the

natural environment and embedded within Pacific Island cultures. LEK is celebrated and valued as a knowledge system that leads to more effective biodiversity conservation and therefore, is centralised throughout the stated actions for MPAs. As LEK is embedded within culture, its centralisation within the Pacific Island's regional MPA management empowered LEK holders to be leaders and key stakeholders for decision-making and planning processes for MPAs. This has resulted in a strong emphasis on MPAs supporting livelihoods and communities through protection and sustainable management of biodiversity and natural resources.

Upon critical reflection of this finding, it is clear that LEK cannot, and should not, be considered as a knowledge system in isolation from LEK holders within either research or environmental management. Separating LEK from LEK holders will fail to fully capture and understand valuable knowledge surrounding the natural environment, and further isolate local and Indigenous communities within systematic conservation planning models such as MPAs. This inclusion of LEK holders will be critical to address at the international level, particularly within the IUCN's global standards for MPAs and the Aichi Biodiversity Targets for MPAs. These global standards and targets provide guidance and support for regional MPAs but are also currently a barrier for the Pacific Island region to fully realise its aspirations and actions for strong inclusion of LEK and LEK holders within the region's MPAs.

### 7.3 Barriers for strong inclusion of LEK within regional MPA management

This research also examined whether the inclusion of LEK within MPA management would support regional efforts to meet global MPA targets, set out under the Aichi

Biodiversity Targets and the SDGs. While the Pacific Island region has centralised LEK and LEK holders within MPA management, its efforts are currently limited by a lack of cohesion within international level documents, agreements and bodies. A discrepancy was identified in the horizontal alignment between regional MPA frameworks and action plans and their identification of where regional documents transfer into at an international level. A further discrepancy was identified between how LEK has been included within regional MPA targets and stated actions, and global MPA targets. This presented a barrier for the region in fully realising its aspirations and stated actions for strong inclusion of LEK. Table 4 illustrates this conclusion through the use of traffic light colours that represent the strength of LEK inclusion within MPA management.

### 7.3.1 Horizontal misalignment as a barrier to strong inclusion of LEK

While the regional effort to include LEK and LEK holders within MPA management is already strong, some of the regional MPA documents failed to identify which international bodies and documents they transfer into. This has limited the region in its ability to fully realise its visions and stated actions for including LEK and LEK holders, as vertical cohesion is critical to the success of protected area management.

### 7.3.2 Vertical misalignment as a barrier to strong inclusion of LEK

The results from this study indicated that there is a lack of cohesion between regional level and international level inclusion of LEK; regional stated actions for inclusion of LEK are much stronger than international stated actions for inclusion of LEK (see Table 4). As the Pacific Island region has explicitly stated that it is working towards achieving international stated actions for MPAs such as the Aichi Biodiversity Targets,

its ability to fully realise its aspirations and stated actions for the inclusion of LEK and LEK holders is limited by weaker international efforts.

## 7.4 Global Fit

Once again, the Pacific Island region has appeared as a champion within ocean management, and the international community needs to learn from how the region is protecting its marine environments through impactful and meaningful inclusion of Indigenous and local communities. It is particularly critical that the international community addresses its shortcomings surrounding its inclusion of LEK to adequately support appropriate integration of local and Indigenous communities within the Pacific Island region's MPA management and governance. As seen in Table 4 and as discussed in the previous section, the Pacific Island region's efforts for including LEK within MPA management have been restricted by international level inclusion of LEK. There is more urgency than ever before to protect the ocean, particularly coral reef ecosystems that are highly vulnerable but also critical for maintaining ocean biodiversity in many regions of the world. At the same time, there is an urgency to protect the LEK that is intrinsically connected with biodiversity and threatened ecosystems. As the biodiversity loss continues to increase at an alarming rate, we are also losing the knowledge that is tied to the local environment and livelihoods. At the same time, LEK and LEK holders can provide valuable insight and leadership for global marine protection and conservation.

The Pacific Island region is extremely vulnerable to global environmental issues such as climate change and biodiversity loss (Govan et al., 2009). The majority of countries and territories are developing or least developed countries (LDCs), and climate related

changes are already taking place and impacting the quality of life and livelihoods within the region. Many countries are dealing with fresh water salination, storm surges and more extreme stormy weather (*ibid.*). In the decades to come, low-lying island countries and territories are expected to be partially or fully submerged, an impact of climate change that has the potential to displace a number of Pacific Islanders, most of whom have not significantly contributed to the human activity that has caused this issue (IPCC, 2018). The majority of people within the region are Indigenous, and so the majority of models for marine managed areas have been driven by Indigenous, traditional and local knowledge (Govan et al, 2009). This combination of factors makes the Pacific Island region unique, and this research provides insights that the global community needs to consider with urgency if it is to support and engage in effective MPA management within the world's largest, and most ecologically diverse, ocean.

## 7.5 Recommendations

Based on the above conclusions, this research has generated three recommendations for future research, the Pacific Island region and the international community, respectively. These recommendations address the appropriateness of researching LEK, as well as barriers to comprehensive inclusion of LEK for the Pacific Island region at the regional level and at the international level.

### 7.5.1 Recommendation for future research on LEK

Future research on LEK should shift the focus from LEK as a knowledge system to LEK holders. This is particularly critical for research concerned with how to strengthen

synergies of Indigenous, traditional and local knowledge systems, policy and science within natural resource management and conservation. By recognising that LEK cannot be separated from the LEK holder, researchers can conduct more impactful and meaningful research on local and Indigenous community involvement within systematic conservation models that have typically adopted top-down management approaches.

### 7.5.2 Recommendations for the Pacific Island region

First, the Pacific Island region should build on its already strong inclusion of LEK within regional MPA documents by improving its horizontal alignment, particularly when stating where regional efforts feed into on an international level. Some regional MPA documents go some way to doing this, by identifying the CBD's Biodiversity Strategy and Aichi Biodiversity Targets, and the UN SDGs. By doing this, the region will present a robust approach to including LEK within MPA management.

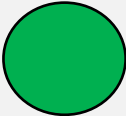


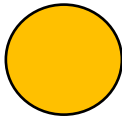
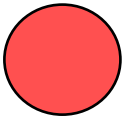
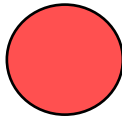
Second, the Pacific Island region should challenge the CBD, UN and IUCN on their surface level inclusion of LEK and LEK holders within environmental management. By failing to include LEK and LEK holders as a cross-sectoral objective within global MPA guidelines, standards and targets, the international community does not meet standards set at the highest level of environmental governance to appropriately integrate partnerships with local and Indigenous communities within environmental management of biodiversity. This discrepancy at the international level has limited the Pacific Island region's ability to fully realise their aspirations and stated actions for equality and representation within MPA management and governance.



### 7.5.3 Recommendation for international environmental organisations

While inclusion of local and Indigenous communities within environmental management has been stated as a central focus for the international community, the lack of impactful and meaningful inclusion of LEK within targets and global standards for MPAs has limited effective MPA management within the Pacific Island region. Regional aspirations and stated actions have been robust and comprehensive in comparison to international efforts. The international community needs to identify the inclusion of LEK and LEK holders as a cross-sectoral objective within all targets and global standards pertaining to MPAs. This amendment will be critical for advancing effective MPA management.

Table 4: The strength of inclusion of LEK within regional Marine Protected Area (MPA) documents, and international level MPA targets and global standards. **Key:** Green = strong inclusion; orange = moderate inclusion; red = weak inclusion. **Abbreviations:** CBD, Convention on Biological Diversity; IUCN, International Union for Conservation of Nature; NBSAP, National Biodiversity Strategy and Action Plan.

	<i><b>Stated Actions</b></i>	<i><b>Research Findings</b></i>	<i><b>Global Fit</b></i>	<i><b>Recommendations</b></i>
<b>Regional</b> <i>Framework for a Pacific Oceanscape</i>  <i>Framework for Nature Conservation and Protected Areas</i>  <i>NBSAP for Fiji</i>  <i>NBSAP for Palau</i>				<ul style="list-style-type: none"> <li>The Pacific Island region should build on its already strong inclusion of LEK within regional MPA documents by improving its horizontal alignment, particularly when stating where regional efforts feed into on an international level. Some regional MPA documents go some way to doing this, by identifying the CBD's Biodiversity Strategy and Aichi Biodiversity Targets, and the UN SDGs. By doing this, the region will present a robust approach to including LEK within MPA management.</li> <li>The Pacific Island region should challenge the CBD, UN and IUCN on their surface level inclusion of LEK and LEK holders within environmental management. By failing to include LEK and LEK holders as a cross-sectoral objective within global MPA guidelines, standards and targets, the international community does not meet standards set at the highest level of environmental governance to appropriately integrate partnerships with local and Indigenous communities within environmental management of biodiversity. This discrepancy at the international level has limited the Pacific Island region's ability to fully realise their aspirations and stated actions for equality and representation within MPA management and governance.</li> </ul>
<b>International</b> <i>CBD's Aichi Biodiversity Targets</i>  <i>IUCN's global standards for MPAs</i>				<ul style="list-style-type: none"> <li>While inclusion of local and Indigenous communities within environmental management has been stated as a central focus for the international community, the lack of impactful and meaningful inclusion of LEK within targets and global standards for MPAs has limited effective MPA management within the Pacific Island region. Regional aspirations and stated actions have been robust and comprehensive in comparison to international efforts. The international community needs to identify the inclusion of LEK and LEK holders as a cross-sectoral objective within all targets and global standards pertaining to MPAs. This amendment will be critical for advancing effective MPA management.</li> <li>Future research on LEK should shift the focus from LEK as a knowledge system to LEK holders. This is particularly critical for research concerned with how to strengthen synergies of Indigenous, traditional and local knowledge systems, policy and science within natural resource management and conservation. By recognising that LEK cannot be separated from the LEK holder, researchers can conduct more impactful and meaningful research on local and Indigenous community involvement within systematic conservation models that have typically adopted top-down management approaches.</li> </ul>

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