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CHAPTER 1 - INTRODUCTION

1.1 Theoretically based MPA investigations

Marine protected areas (MPAs) are one of the most widely used tools for the management and conservation of coral reef fisheries and ecosystems (Mora et al. 2006; Wood et al. 2008). Ecological theory has been the primary contributor to contemporary MPA science to date, specifically by designing and investigating closures that meet ecologically validated criteria: size, spacing, representativeness, larval connectivity, and networking (Airame et al. 2003; Almany et al. 2007; Ballantline 1997; Baskett et al. 2007; Jones & Carpenter 2009). Although new breakthroughs in ecological marine science are continuously made (Almany et al. 2009; Cudney-Bueno et al. 2009; Planes et al. 2009), many MPAs (particularly those in developing countries) have failed to meet their management objectives (Alder 1996; Kelleher et al. 1995; McClanahan 1999). While there exist substantial gaps in the marine science pertinent to MPAs (Sale et al. 2005), it is now widely recognized that MPA failures are equally due to social, economic and cultural factors (Christie et al. 2009; Cinner 2007; Mascia 2003).

In theory, MPAs prevent or minimize human extractive pressure on resources and associated human-caused ecosystem damage (Roberts & Polunin 1991). Marine protected areas therefore have as much to do with managing people as with managing fish (Laffoley 1995; Maguire et al. 1995). In consequence, a ‘successor science’ has been called for which explicitly acknowledges that natural resources are part of complex social-ecological systems, in which there are inextricable links between individual components (Berkes et al. 1998; Cinner et al. 2009; Folke & Rockström 2009; Goldman 1997; Paavola et al. 2009). Until very recently, there existed a critical gap between acknowledging the importance of cross-disciplinary variables and actually placing them within social-ecological theoretical frameworks.

This dissertation aims to bridge that gap by contextualizing marine protected areas as linked components of social-ecological systems. Focusing on a set of coral reef marine protected areas in the Republic of Vanuatu gave me the opportunity to explore, in comprehensive detail, the contextual social and ecological factors which influence and are influenced by them. Specifically, this dissertation sets out to investigate how broader ecological, social, cultural and political contexts influence the selection and outcomes of different MPA operational rules. To achieve these aims, the dissertation is divided into twelve chapters each addressing gaps in present MPA theory and understanding.

1.2 Addressing critical gaps with the Vanuatu case study

To date, much of the empirical research on the integrated social and ecological components of MPAs has been focused on single case studies (Aswani 2002; Cinner et al. 2007; Crawford et al. 2006; Pomeroy & Douvere 2008). However, single case study investigations run the risk of suffering from endogeneity, foregoing general applicability
because unique local contexts (with an unlimited number of potential causal conditions) may underlay correlations and conclusions (Agrawal 2003). To overcome this problem Agrawal suggests that purposive sampling be utilized in structured comparative case analyses to select cases for the variation they represent in theoretically significant variables (2003 pp 255). Accordingly, robust empirical comparative case studies of MPAs should control or minimize variation that is not theoretically significant.

Additionally, investigations about MPA success should focus on those regimes that have been maintained over time. Although many MPAs in the Caribbean, and South East Asia have experienced high failure rates (Burke et al. 2002; Burke & Maidens 2004; Kelleher et al. 1995), those in the Pacific Islands have, in many cases, achieved moderate levels of success (Alcala & Russ 2006; Gilman 1997; King & Faasili 1999; Pomeroy et al. 1997) (although there are examples of Pacific failures (Cinner et al. 2009) and South East Asia successes (Pollnac & Seara 2010; Pollnac et al 2001; Christie and White 2007). The Pacific Islands region has been identified as a “major priority” for new protected area expansion (Rodrigues et al. 2004), and is experiencing a renaissance of locally-based marine management initiatives (Johannes 2002b). The Republic of Vanuatu in particular has received considerable attention for the success of its community-based marine closures (Johannes & Hickey 2001; Johannes 1998b).

Chapter two establishes the suitability of MPAs in the Nguna-Pele area of Vanuatu to serve in this type of structured case study comparison: half of these MPAs have strict no-take operational rules, while half allow periodic harvest. Building theoretically structured case study analyses around successful MPAs in Vanuatu (and the contexts in which they operate) may provide information that is broadly relevant to marine management elsewhere.

Commons pool resource scholars are now refining frameworks which enable practitioners from different disciplines and working with different theories to investigate complex social-ecological system interactions and outcomes (Anderies et al. 2004; Ostrom 2007; Ostrom et al. 1994). Although applied widely to natural resource management scenarios including forestry, fisheries and agriculture (Gibson et al. 2000; Meinzen-Dick 2007; Rudd 2004), these social-ecological frameworks have not yet been applied to MPA investigations. Chapter three establishes the theoretical underpinning for this dissertation. It reviews the applicability of commons theory for investigating Vanuatu’s MPAs and presents alternatives that explicitly situate MPAs within complex social-ecological system frameworks.

1.3 Moving beyond site-based understanding

In the Pacific one finds an array of marine use and management initiatives (Aswani et al. 2007; Aswani & Lauer 2006; Carrier 1987; Cooke et al. 2000; Hviding 1996; Jennings & Polunin 1996b; Johannes 1978; King & Faasili 1999; Polunin 1984; Wright 1985). These practices are often labeled ‘customary’ and considered integral components of Pacific Island culture (Foster & Poggie 1993; Lam 1998; Ruddle et al. 1992; Veitayaki 1997). It is often argued that these strategies have been in place for centuries (Johannes 1998a;
Ruddle 1989) or even millennia (Hickey 2001). Although rarely visible to those outside the Pacific, there is strong internal pressure for communities to conform to and emphasize an indigenous identity, even though the historical factuality of these practices is unknown (Foale et al. 2005; Redford & Richter 1999).

In order to move beyond suppositions and assumptions about the historical existence and contemporary relevance of customary marine management in the region as a whole, robust historical research is required. Various studies have sought to validate the historical longevity of customary management in the Pacific Islands, although they tend to be housed within a single discipline like archaeology (Dalzell 1998) or anthropology (Foale 2008). Multidisciplinary assessments have examined the historical management of Pacific forests (Bayliss-Smith et al. 2003), but this approach has not yet been applied to investigate MPAs or customary marine closures. Chapters five through seven address this gap by investigating the longevity of ‘customary’ marine resource management on Nguna and Pele using diverse disciplines including ecology, oral traditions, ethnography and archaeology.

1.4 Answering locally relevent and posed questions

As highlighted in the prologue, this dissertation developed alongside questions posed by local residents about their community coral reef marine protected areas. Answering questions for and alongside indigenous communities was facilitated by participatory tools that are commonly underpinned by decolonizing research epistemologies. Chapter four describes the philosophical orientation of this dissertation and details the specific approaches used to ensure that knowledge was equitably generated and that local people’s specific questions were addressed. In many cases, locally-posed questions probed obvious gaps in the existing scientific knowledge about MPAs. For example, local village councils wanted to know which of the two MPA regimes employed on Nguna and Pele was more biologically effective: no-take reserves or closures that allowed periodic harvests.

Much of the marine-reserve literature focuses on the outcomes of permanent protection (e.g. Lester & Halpern 2008; Russ & Alcala 2004), whereas periodically harvested marine closures have received little attention. In many developing countries, including those in the Pacific Islands, socioeconomic realities, utilitarian mental models, and high dependence on resources inhibit the use of permanently closed marine reserves (Crawford et al. 2006; Foale & Manele 2004; McClanahan 1999). Closures that allow periodic harvest may be more appealing to subsistence users and enjoy higher compliance of rules and restrictions (Aswani et al. 2007; Cinner et al. 2005a). However, only a handful of studies have contrasted the ecological outcomes of permanent and periodically harvested reserves (Aswani & Weiant 2004; McClanahan et al. 2006; Williams et al. 2006). Furthermore, these studies have been confounded by sampling designs that lack robustness (Aswani & Weiant 2004), harvest scenarios which do not match those of most Pacific Island communities (Williams et al. 2006) or case studies with variable reserve size, habitat structure and cultural contexts (McClanahan et al. 2006). Chapter eight
addresses this critical gap, by empirically investigating the outcomes of MPA strategies that contrast with the dominant no-take paradigm.

Island residents also asked why some communities establish strict no-take reserve rules while others do not. Despite their widespread contemporary implementation, the suitability of marine protected areas in the Pacific Island region has been called into question, principally for an assumed incongruence with local ideologies (Foale & Manele 2004; Ruddle & Hickey 2008). Recent reviews suggest that the motivation for Pacific Island marine management expansion is grounded in food security concerns (Bell et al. 2009) and not in abstract biodiversity conservation concepts (Adams & Dalzell 1994) nor due to a conservation ethic (Foale 2001). However, studies of MPA motivations in the Pacific Islands have not been based in robust empirical research, as they have elsewhere (Brown et al. 2001; Dixon et al. 1993; Oracion et al. 2005). Chapter nine addresses this gap by investigating why communities on Nguna and Pele are motivated to establish different types of MPAs and whether or not they perceive each to be successful in meeting local objectives.

In addition to potentially producing different ecological outcomes, different MPA strategies can have very different impacts on stakeholders depending on the socioeconomic context in which they operate (Cinner 2007; Foale & Manele 2004). The resource management literature has focused heavily on the contextual conditions that are associated with successful management regimes including MPAs (Mascia 2004; Ostrom 1990; Pomeroy et al. 2001; Pomeroy et al. 1997). Most recently however, investigators have begun examining the conditions that enable regimes to emerge or be selected by collective action groups (McCay 2002), although these studies have yet to examine the emergence of different MPA strategies. Expanding on the local query about why different MPAs regimes are variously selected, Chapter ten investigates the socio-economic and contextual conditions which may enable the emergence and selection of divergent MPA operational rules.

Confounding both MPA policy and investigation, communities in the Pacific Islands are diversely labeling their marine closures as protected areas, reserves, sanctuaries, conservation areas, managed areas and taboos (Caillaud et al. 2004; Keen & Mahanty 2006; Veitayaki 2003). Thus conflicts are arising in the Pacific similar to those that erupted internationally over what was meant by the phrase ‘marine protected area’ (Agardy et al. 2003). The MPA terminological dispute was subsequently abandoned (Gaines et al. 2001) particularly when all acknowledged the ideological nature of the debate. Chapter eleven seeks to investigate the contemporary discourse surrounding community closures in Vanuatu, highlight emerging patterns and provide practical opportunities for concensus to move past ideological constraints to MPA development.

Chapter twelve holistically combines the findings from each of the preceding chapters into the theoretical framework presented in Chapter three. It serves as a platform to 1) contextualize the social and ecological variables found to be important to the MPAs on Nguna and Pele and 2) highlight broader lessons about MPAs that can be learned from
this Vanuatu case study. This final chapter summarizes the contribution the dissertation makes to Commons theory and MPA science; particularly through its challenge to widely held paradigms, theoretical frameworks and disciplinary methodologies.

1.5 Structure of the dissertation

The governance of marine resources in Vanuatu is, like most real-world problems, a complex puzzle. The dissertation begins with a comprehensive review of the existing archaeological and historical information on marine resource use in central Vanuatu. The historical archives provided the basis of a critique of existing paradigms of customary marine management including the taboo institution. Next I examine the political nature of kastom, and relate it to the prevalence of and implications for current marine management rhetoric. Then I, alongside a dedicated team of Nguna-Pele colleagues, set out to investigate the ecological effectiveness of different coral reef closure strategies. In addition we examine the motivations for establishing contemporary closures as well as the socio-economic factors which may enable reserve selection.

The reader will detect a common thread running throughout the dissertation based on the theoretical framework presented in Chapter three. Empirical findings are continuously reconsidered and recontextualized as they relate to MPAs and other components of linked social-ecological systems. The last chapter formally presents these diverse findings as a set of interrelated variables that define a future research agenda on marine governance institutions.
CHAPTER 2 - THE VANUATU CASE STUDY

2.1 Vanuatu case study context

The Republic of Vanuatu is a Y-shaped archipelago located in the Southwest Pacific Ocean (13°-20°S, 166°-172°E). There is a distance of roughly 850km from the northernmost island to the southernmost. The country is comprised of more than 80 islands, many of which are of volcanic origin formed in the Miocene (>5 million years BP) (Amos 2007; Quantin 1975). The total land area of Vanuatu is 12,336km² (NACCC 2007), set within a 200-mile exclusive economic zone (EEZ) of approximately 680,000km² (King 2007).

Vanuatu’s coastline extends for 2,500km, much of which is vegetated by coconut plantations (UNDP 2005), and fringed with ~620km² of coral reefs (King 2007). The area of accessible inner reefs and lagoons is approximately 448 km² (Amos 2007). The National Biodiversity Action Strategy lists 34 endemic, endangered or threatened species in Vanuatu, including 7 fish and 2 mollusc species (Vanuatu Environment Unit 1999). Due to its high endemic biodiversity, Vanuatu has been included in Conservation International’s Eastern Melanesian hotspot (Conservation International 2005; Myers 2003).

The national GDP is approximately $1,500USD (although it has remained constant over last twenty five years) ranking Vanuatu of 207th out of 233 countries (Henckel 2006). On the United Nations Human Development Index, Vanuatu ranks 118th of 177 countries (Henckel 2006). Absolute poverty levels are high, with twenty six percent of the population subsisting on less than $1 US dollar per day (King 2007). More critically, around forty percent of the population do not have access to clean water (Henckel 2006) and less than 0.1 percent of the population are enrolled in secondary school (Hughes & Sodhi 2008). Accordingly, Vanuatu is currently ranked as a Least Developed Country (LDC). However, due to recent improvements in human indicators like health and literacy, the UN has begun to review its status. The national government hopes to avoid the status “graduation”, and maintain current levels of aid and trade assistance, by making the case that it remains extremely environmentally and economically vulnerable.

Population in Vanuatu has risen by 2.5 percent since 1975, giving it one of the highest population growth rates in the region (after Nauru 5.4 percent and the Solomon Islands 2.9 percent) (Hughes & Sodhi 2008). Today Vanuatu’s population stands at just over 220,000 (Bakeo et al. 2000). Roughly eighty percent of the population reside on the coastal plains which encircle the rugged interiors of many islands (Mourgues 2005), although small interior villages can be found on the islands of Tanna, Malekula and Santo. Population density is relatively high, with sixteen people per square kilometer (King 2007). The most densely populated areas are in and around the two major urban centers of Port Vila (Efate Island) and Luganville (Santo Island). Vanuatu’s population is
one of the most linguistically and culturally diverse in the world (Crowley 2007; Lynch & Crowley 2001).

Eighty percent of the population engage in artisanal agriculture and seventy seven percent in small-scale fisheries (Bakeo et al. 2000), infrequently using cash currency in daily interactions (Bazeley 2006). Tourism is rapidly emerging as a major contributor to the economy, particularly in urban areas, with international arrivals increasing by sixty percent from 2003 to 2008 (Duncan 2008). However, much of the country is cut off from tourism, living without electrification or major infrastructure (Johnston 2005). With the relatively recent but widespread use of small generators and solar panels, even remote islanders are now frequently using small appliances like televisions and mobile phones (Pacific Institute of Public Policy 2008).

2.1.1 Resource management responsibilities; national and local

As a signatory to international biodiversity conventions and treaties1, the central government of Vanuatu has a responsibility to implement and manage protected areas. To meet these obligations, Vanuatu’s parliament has passed several pieces of legislation that deal broadly with natural resource management and conservation2. The constitution gives all land to ni-Vanuatu customary owners and their descendents3 along with the duty to protect and safeguard national resources and the environment (Government of Vanuatu 1988). Several pieces of auxiliary legislation specifically enable the creation of MPAs, including the National Parks Act (national parks), the Forestry Act (conservation areas), the Environmental Management and Conservation Act (community conservation areas), the Protection of Sites and Artifacts Act (protected sites), the Decentralization and Local Government Regions Act (protection zones) and the Fisheries Act (marine reserves).

The Fisheries Act (Cap 158, 1982) governs the use of “Vanuatu waters”. It defines these as “waters of the exclusive economic zone, territorial sea, archipelagic waters, and internal waters…and any other waters over which Vanuatu claims fisheries jurisdiction.” It specifically curtails the harvesting activities of foreigners and ni-Vanuatu (i.e. licensing, gear restriction, and species protection) although these restrictions are notoriously difficult to enforce and often go unheeded in rural areas.

Section 20 of the Fisheries Act provides for the establishment of marine reserves. Specifically, “the Minister may, after consultation with owners of adjoining land and with the appropriate local government council, declare any area of Vanuatu waters and the seabed underlying such waters to be a marine reserve.” As signaled by the minister’s direct intervention, this type of designation is for areas of high social or ecological relevance and is generally not appropriate for the small-scale community closure.

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3 The definition of customary land owner is the source of much conflict and debate in Vanuatu. In general, land was never historically owned by individuals, but rather by clans, tribes and family groups.
The Department of Environment and Conservation, on the other hand, has recently begun to implement the Environmental Management and Conservation Act of 2002. It is specifically designed to recognize and enable small scale community conservation closures. Part (4) of the EMAC Act provides for the recognition and registration of permanent Community Conservation Areas (CCAs). Registration is subject to four community requirements: the area must have 1) ecologically sound management objectives; 2) clear and undisputed boundaries; 3) consent and approval from interested parties; and 4) an appropriate management plan.

Confounding the issue of responsibility for protected areas however, Vanuatu’s ministries and government departments often hold overlapping mandates, and intra-organizational coordination is minimal and fraught with gaps (King 2007; Lane 2006; Tom’ Tavala & Hakwa 2004). “In terms of institutional consciousness and preparedness [for protected areas] the situation in Vanuatu is arguably depressing…much remains to be done in the area of intergovernmental and inter-institutional coordination.” (Lane 2006 pp 6). To improve governmental cooperation in support of village-based resource management, the Vanuatu Village Based Resource Managed Areas Network (VBRMA) was established in 2009.

In the Pacific Islands in general, and in Vanuatu in particular, governance and decision-making institutions most commonly operate at the community level (Berkes 2009). Despite national-level responsibilities, the actual management of natural resources in Vanuatu is typically undertaken by villages or communities with little direct intervention by the central government (Johannes 1998b; Low & Davenport 2002). This may be due in part to the government’s limited capacity to centrally implement or enforce management across the archipelago (Huffer & Molisa 1999; Lane 2006), as is also the case in other Pacific Island countries (Foale & Manele 2004; Rose 2008). Additionally, bureaucratic and procedural processes operating at national scales may not fully provide adequate support to communities (Rose 2008).

Non-centralized governance and ownership pose significant implementation challenges for effective and well-coordinated marine reserve networks in the Pacific Islands (Lam 1998). Conversely, decentralization affords each community an important degree of flexibility to design and implement an MPA that suits its own contexts and purposes. Ultimately, community-based resource governance, alongside national-level advice and coordination, is Vanuatu’s de facto coastal resource management policy position.
2.2 Case study of MPAs on Nguna and Pele islands

Nguna and Pele Islands are located in the central part of the Republic of Vanuatu, in Shefa province (17°S 168°E). These islands were formed by volcanic eruptions in the Late Pleistocene (~10,000 years BP) and make up the lower rim of a major submerged caldera to the north (Greene et al. 1988). The fertile soils of Nguna and Pele reflect the continuous volcanic activity occurring until very recently. Nguna’s highest point is, in fact, a dormant volcanic cone. A recent archaeological dig on Nguna found more than two meters of basaltic topsoil, likely originating from the Kuwae eruption in AD 1425 (Bedford 2004; Monzier et al. 1994).

The North Efate region is colloquially known as “Taleva” or “the other side”, and is circumscribed geographically. The Taleva region, covering roughly 95km², includes the Northern quarter of Efate as well as the satellite islands of Nguna, Pele, Moso, Lelepa and Emao. These satellite islands are situated between one and seven kilometers off the north coast of Efate (Figure 1). More than forty villages with a combined population of 10,000 identify themselves as belonging to the Taleva region, each speaking the same Nakanamanga language (Lynch 2000).

Each of the islands in the Taleva region, including Nguna and Pele, is surrounded by fringing reefs (Dickinson 2001). These reefs are generally no more than 100 m wide and in many places begin directly on the shoreline. Coral reefs constitute the nation’s most biologically diverse coastal system (Amos 2007). Efate’s 8,100 hectares of fringing coral reef make up roughly eighteen percent of the national total, the largest portion of any one island (ibid).

Like the rest of rural Vanuatu, the people of Nguna and Pele subsist on the products of agricultural and fisheries activities. However, small-holdings agriculture is undoubtedly
the most socially and economically important subsistence activity practiced by local residents (Lini 1980). Income on Nguna and Pele is largely generated by supplying root crops, fish and handicrafts to the national market in nearby Port Vila (the capital city of Vanuatu). Other forms of income also support the local economy including small trade stores, tourism bungalows, boat and truck transport, small-scale construction and family remittance. The largest expenses for families on Nguna and Pele include school fees, store bought-food (like rice, tinned fish, sugar and kerosene), clothing, community fundraising obligations and church tithes/offerings.

Figure 2 Women in the North Efate area preparing the traditional dish of laplap for sale in the Port Vila market

2.2.1 Population and organization

The combined population of Nguna and Pele Islands was just over eleven hundred people at the time of the last national census (Bakeo et al. 2000). It is spread unevenly among sixteen communities or villages, ten of which are located directly on the coast. No village is more than a three-hour walk from any other. Villages on Nguna and Pele range in population size from under 100 to over 500 people.

A hereditary paramount chief presides over each village, assisted in governance duties by one or more lower chiefs. The function of the paramount chief largely deals with preservation and promotion of custom (Bolton 1998). Day-to-day affairs and community administration however, fall to the democratically elected village council as is common in other parts of the country (Huffer & Molisa 1999). The council apparatus is a direct artifact of the influence of the Christian Church, and is often made up of several specialized committees and working bodies.

2.2.2 Terrestrial resource use and ownership

In Vanuatu, all land belongs to customary owners by decree of the national constitution. However, the definition of customary ownership remains undefined and has partly led to the current legitimization crisis facing the nation (Nari 2000). In Vanuatu, customary

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4 Planning committee, conservation committee, kindergarten committee, water committee, project committee, etc.
land owners are not always (or even usually) individuals, a trait that existing statutory land policy does not appropriately capture (Regenvanu 2008). Group rights of access to natural resources is the norm in Pacific Island societies, and is especially relevant and commonplace in the marine context (Ruddle 1998).

Encouraged by regional economic policies and exacerbated by investor-driven land acquisition (Hassall 2005; Regenvanu 2008), there is a trend away from group and toward private land ownership in Vanuatu. Today land stewardship rights are transferred patrilineally, yet decisions about extraordinary use and major developments must be made at the communal level (Arutangi 1971). On Nguna and Pele, land areas and garden plots currently have relatively clear boundaries, though ownership lies with extended families rather than individuals. However, in recent years some individuals have sought to acquire legal deeds over their land. Official land deeds are a source of much dispute and controversy on Nguna and Pele, often causing the breakup of family and community groups. According to public knowledge, no land on Nguna and Pele has (as yet) been leased to foreign investors.

Village boundaries on Nguna and Pele are different from the boundaries that demarcate family land parcels. A family/individual can hold land in several different villages, but a strong sense of village-ism and community patriotism exists on these two islands. Identifying with and belonging to a particular community or village affords a critical safety net, ensuring continuous access to resources, even for those without hereditary entitlements (Jowitt 2008). Thus, the geographical boundaries of a community hold utilitarian importance on Nguna and Pele, even though most families have access rights to land outside their own community. Village boundaries on Nguna and Pele commonly originate from the top of a hill and follow a well defined physical feature, such as a creek or stone wall, to the coast.

Due to the uncodified and heterogeneous nature of a ‘community,’ village boundaries are typically unclear and commonly under dispute. Most villages have areas of overlapping boundaries with adjacent communities. An unremarkable fact of life for most residents, these boundary disputes have occasionally flared up into hostilities when benefits of tourism or infrastructural development were at stake.

Despite infrequent tensions between communities, the Nguna-Pele area is locally renowned for its area-wide historical collaboration. Villages on the two islands share a unique dialect as well as similar cultural and customary practices. Intermarriage among island villages ensures that social connections remain strong. A legacy of the Christian Church’s presence on Nguna and Pele (see Chapter seven) is the existence of robust, dual-island networks like the Nguna-Pele Presbyterian Session and the Nguna-Pele Council of Chiefs (NAPE).

2.2.3 Marine resource use and ownership

Few individuals or households on Nguna and Pele make an exclusive living from the sea, though most are involved in opportunistic fishing and reef gleaning. Some coastline
villages, those on Pele for example, have a more frequent interface with sea resources than their inland counterparts. Household diets of sea resources is variable on both islands and is dependent on the capacity and time allocated to fishing by family members.

Figure 3 Men from Nguna and Pele fishing and collecting octopus

In general, no single individual in Vanuatu can legally claim an area of reef as his own private property, even if his land sits adjacent to the sea. The Land Leases Act (Cap 163) stipulates that legal land tenure extends only to the mean high water mark. While land can be titled and leased under Vanuatu law, the sea remains the exclusive domain of the state and customary owners (Johannes 1998b). Although reefs legally belong to the state, local communities are considered the de facto owners of adjacent reefs. But, in stark contrast to land ownership, areas of reef on Nguna and Pele are not partitioned off for use by particular families or groups. A myriad of perceptions about marine boundaries on Nguna and Pele make them inherently difficult to identify. Many consider the sea tenure boundary to extend well into deep water, with some even citing the horizon.

Reefs are openly used by all members of a given community, with residents rarely excluding their fellow community members. Full time residency is the most common, but not exclusive, determinant of community membership and reef usage rights. Regular access to marine resources may be an important motivation for seeking clear and well-recognized community boundaries. Community access to marine resources is generally allowed if it fulfills subsistence or small-scale commercial needs. Major developments however, such as shoreline construction or large-scale commercial harvest, require permission of the chief and the village council. It is not uncommon for a village member to make a monetary contribution to the council when undertaking a larger-than-usual harvest from village sea tenure area.

Exclusion of non-community members from using village resources is a de facto practice on Nguna and Pele. While the reef is considered public domain within the community, individuals from neighboring villages are actively excluded. It is generally not tolerated for an outsider to fish on a village’s reefs, even if those reefs are located hundreds of meters off the coast.
2.2.4 Marine resource governance

Although respect for the chiefly institution has eroded throughout the region, it remains robust in most parts of the Vanuatu archipelago (Forsyth 2004; Lindstrom 2008). One role of the chief is to grant or revoke permission for outsiders to use a community’s reef resources, although this right does not imply his ownership over those resources (Taurakoto 1984). Permission must always be sought from the chief before reefs can be used by an outsider. In practice, however, the village council holds daily responsibility to define the uses, developments and restrictions within the community’s sea tenure area.

The Nguna-Pele area may be one of the most advanced in Vanuatu in terms of its general consciousness of natural resource management issues. Each community’s village council has established a conservation committee, whose primary responsibility is the maintenance and regulation of terrestrial and marine resources. Conservation committees propose and adapt the specific rules for use of the reef. These committees report to and follow the mandates of the village council, who in turn work under the guidance of the paramount chief.

It is considered everyone’s responsibility, including residents, the conservation committee, village council and chiefs, to comply with village marine regulations and report trespassers. Enforcement and surveillance is not difficult in most cases, as reef areas are visible from the village. In cases where the reef is located away from the settlement area, trespassing events are reportedly more frequent.

Infraction of the rules by community members generally incurs a fine payable to the chief, which he divides among the council and conservation committee5. Infractions that involve non-community members are dealt with directly by the chief or village council of each respective community. Fines for non-community members are generally higher as these offenses are viewed as more severe6.

In general, tension and ambiguity characterize the relationship between village, provincial and national-level marine policies. Higher levels of government do recognize local governance institutions via official Island Courts and Land Tribunals, but village councils do not yet receive formal endorsement or authority in national legislation7.

2.3 Fisheries closures, coral reef reserves and diverse MPA operational rules

Two types of marine closures are common in the Nguna and Pele area: those that are permanently protected and those that are periodically harvested. Permanent reserves are those in which the community indefinitely closes all harvest activities. As in other places in Vanuatu, these are often called protected areas, conservation areas or MPAs. In

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5 Fines are typically on the order of 500vatu ($5USD) for a first offense and a pig for repeated offenses
6 These fines may start at 10,000vatu ($100USD) and include pigs and woven mats
7 The Environmental Management and Conservation Act is currently being amended to formally recognize the marine regulations set by village councils, however it will not provide for rule enforcement or penalization.
contrast, periodically harvested closures do not permit harvest during their term but are
designed to be re-opened in the not-too-distant future. These are often called 'taboos' on
Nguna and Pele. Periodically harvested reserves may allow infrequent and well-
controlled harvest at any time, but generally not more than one or two times per year.

Closures of all types generally restrict all species enclosed within them, although reserve
openings and harvests may target specific organisms. For example, a harvest event may
allow the capture of fish, but forbid the collection of trochus or giant clams. In some
communities, the harvest of important species like trochus, biche-de-mer and giant clams
are always prohibited, inside and outside of closures.

The decision to implement a marine reserve is nearly always taken democratically. The
village conservation committee commonly makes the suggestion in a village meeting,
followed by public debate among residents. If approved, residents discuss potential
locations and the closure rules to be implemented. Final approval by residents to declare
an MPA can take up to a year of detailed planning by the conservation committee. When
a declaration date is fixed, notices are sent to adjacent villages informing them of the
impending closure.

Each closure declaration is attended by particular rites and formalities, therefore
ceremonial preparations for the closure are usually made well in advance. The village
chief, acting as the symbolic resource steward, proclaims the area off limits following the
terms agreed by the community. The paramount chief, or one of his assistants, will
generally evoke ancestral and magical protection over the area, deterring potential rule-
breakers and trespassers. Often, several pigs are killed at the site. Boundaries of the
closed area are demarcated with recognizable custom objects. On Nguna and Pele, a
namele palm leaf tied to a stake is the most commonly-employed marker, though large
white stones, pig jaws and painted signs are also used.

Figure 4 Paramount Chief with the namele palm MPA marker

2.3.1 Networking of community MPAs

In 2002, four paramount chiefs established the Nguna-Pele Marine Protected Area
Network in order to better coordinate the management of their village marine closures.
They felt that village strategies were ineffective in isolation; resources were declining at
an unprecedented rate. With the technical and ideological assistance of the Fisheries
Department, the Vanuatu Environment Unit and international volunteer organizations, the network’s membership has since expanded to include fourteen communities on Nguna and Pele\textsuperscript{8}.

The Nguna-Pele MPA network is managed by representatives from each member community. Membership is open to all communities on the two islands. A full-time local manager, several part-time local staff and local village volunteers carry out the day-to-day activities of the network. These activities include cleanup campaigns, awareness talks, sea turtle tagging, eco-tourism, tree planting, social-ecological monitoring, and management evaluation.

The Nguna-Pele MPA network itself does not hold ownership, decision-making or enforcement rights over the sea-tenured areas of any of its village members, nor does it dictate the type of closure and associated rules to be implemented. Rather, the network brings together representatives from each community to discuss, coordinate, and collaborate on relevant marine and terrestrial resource issues. Networking has enhanced the political bargaining power of area communities with the national and provincial government, resulting in better support for marine management.

The benefits of networking are widely recognized, with villages often willing to adopt management strategies that may be most directly valuable to neighboring ‘downstream’ communities. For example, a recent Crown of Thorns starfish outbreak was contained because dozens of area representatives planned and jointly implemented a clean-up strategy in the affected village. Discussions at Nguna-Pele MPA Network meetings have also influenced the positioning of new MPAs, particularly at boundaries with other communities, in order to create larger cross-tenure closures. This island-wide collaboration on Nguna and Pele represents Vanuatu’s first attempt at ecosystem-level conservation planning.

2.4 Summary

This Nguna-Pele case study from Vanuatu presents, within a single geographic area, a natural comparative experiment for studying the emergence, evolution and outcomes of diverse types of marine resource management regimes. Although the communities of Nguna and Pele Islands all speak the same language, have experienced similar historical patterns and are faced with the same current social, economic and political pressures, two divergent types of marine management have emerged. This chapter identifies and describes these as permanent no-take marine reserves and periodically harvested taboos. Both types of contemporary closures are integrated within customary, chiefly and ceremonial practices, and are locally governed. Thus, there can be no suggestion that one is internal and the other external. Additionally, marine closures on Nguna and Pele are

\textsuperscript{8} Laonamoa, Worasiviu, Piliura, Worearu, Unakap, Nekapa, Woralaapa, Malaliu, Mere, Matoa, Rewoka, Fareavau, Farealaapa, and Utanlangt. *Taloa village was an original member, but pulled out of the network (and all other island organizations) due to land disputes and political infighting.
driven, managed and enforced by communities, suggesting that benefits of some kind are being locally obtained or perceived.

Community tenure is an important factor related to the establishment of marine closures in the area. The concern over tenure and community boundaries has been shown to both limit and enable marine management on Nguna and Pele. Despite strong community tenure claims and chiefly-vested power over marine resources, cross-boundary discussion and governance has been possible through the Nguna-Pele Marine Protected Area Network. Although likely not acting purely altruistically, communities have demonstrated that they are willing to compromise and collaborate to obtain collective benefits. Networking is likely enhanced on Nguna and Pele because of the shared language, geographical proximity, and shared historical trajectory. Additionally, the network emulates previously existing island-wide organizations and flexibly incorporates both types of MPAs. While not directly implementing or managing reserves, the Nguna-Pele MPA network has a powerful indirect influence on the scope and connectivity of the area’s marine management.

This area proved an advantageous opportunity for this study of marine reserves not only for the natural experiment of permanent and periodic closures, but also the existence of a forward-looking and supportive organization in the Nguna-Pele Marine Protected Area Network. The Network’s existence demonstrates a concern for and receptiveness to marine resource management, something many other communities in the Pacific may yet lack.

Figure 5 Meeting of the Nguna-Pele MPA Network, collecting sea urchins, net fishing, and cleaning fish for market
CHAPTER 3 - MPAS; A THEORETICAL CRITIQUE AND SYNTHESIS

“A paradigm is the equivalent of a language or culture: it determines the questions that can be asked and those that can be excluded, the thinkable and the unthinkable” (Bourdieu & Nice 2004 p 15)

3.1 Orthodox paradigms of marine governance

Marine protected areas (MPA) and marine reserves are increasingly popular tools employed to manage marine resource stocks, protect species, and enhance seascapes (Mora et al. 2006), and today can be found in every coastal country on earth (Chape et al. 2008). However fisheries management in general and MPAs in particular often fail to meet their management objectives (Kelleher et al. 1995; McClanahan 1999; Mora et al. 2009). Although there are substantial gaps in the marine science pertinent to MPAs (Sale et al. 2005), many failures have occurred because local human dynamics and institutional constraints were poorly understood or ignored during MPA planning and implementation (Christie et al. 2009; Mascia 2003). In addition to ecological considerations mentioned in the previous chapter, the core element for successful marine protected area design is preventing human extractive pressure and associated ecosystem damage (Roberts & Polunin 1991), particularly as successful outcomes have less to do with managing fish than with managing people (Laffoley 1995; Maguire et al. 1995). Managing people focuses on strengthening, adapting or developing social institutions, which include norms, rules and shared strategies (Crawford & Ostrom 2000).

Over centuries, the dominant European tradition has defined natural resources as human property; either state owned, private or open access (Feder & Feeny 1991). In fact, property rights theory was one of the first in the social sciences to draw clear links between natural resources and human institutions (Feder & Feeny 1991; Hart & Moore 1990; North 1995). For most of European history, the seas and their resources were considered open-access due to technological and economic constraints (Grotius 1609). However, as sovereign navies in Europe became more powerful, and marine resources more valuable, many countries began enforcing the paradigm of mare clausum or private seas (Selden 1652). Due to the political structures of Europe at the time and the dominance of the European tradition on global affairs today, state-based solutions are ingrained within contemporary fisheries policy (McGoodwin 1990). In essence the state remains the “governing component” and the civil society is the “component to be governed” (Jentoft et al. 2007).

This dominant paradigm is evidenced today by the recent declaration of 200 nautical mile exclusive economic zones (EEZ) around each coastal state (Attard 1987). Even the worldwide MPA phenomenon of mare reservarum or protected seas (Russ & Zeller 2003), relies heavily on the actions of a coercive state and/or market pressures (Mangi et al. 2007; Oracion et al. 2005; Pérez-Ruzafa et al. 2008). Mare reservarum (like mare clausum) is possible in theory because national and international governing bodies are able to dictate the location and operational rules of MPAs and then utilize their navies, coast guards, police and legal systems to enforce those mandates (McGinley 2008; Perera & de Vos 2007).
In 1968, Garret Hardin’s “tragedy of the commons” epitomized the prevailing paradigm about the value of state and market influences for natural resource management. He hypothesized that a resource not subject to use controls will be invariably exploited to tragic ruin, an ideal that remains at the heart of contemporary management and conservation ideologies (Hardin 1968; McCay 2002). Like Aristotle centuries before (Aristotle 1984 Politics II, ch 3), Hardin suggested that better care is taken of private property than that which is under common use. Controversially however, he suggested that resource over-utilization occurs because individuals operating in isolation within an open access scenario have little incentive to exercise restraint. He rationalized that this was because any ecological impacts of selfish behavior would be distributed among the entire population while the overexploiter would retain an economic advantage (Dietz et al. 2003; Ostrom 1990). Hardin further suggested that environmental degradation can only be overcome when property institutions are in place and are manifested through state control or privatization (Hardin 1968).

3.2 An alternative to state control or privatization; collective action

Hardin’s seminal paper sparked an outpouring of scholarship on alternative property rights regimes and institutions that effectively control resource use (Ostrom et al. 1999). Subsequent empirical analysis of real-world situations demonstrated that while many cases lacking strong government enforcement or private property are associated with resource degradation as predicted by Hardin, there are also a vast number of exceptions (Bromley & Cernea 1989; Burger & Gochfeld 1998; Feeny et al. 1990; McCay & Acheson 1987; Ostrom 1990). Best known now as commons theory, this body of research was united in its opposition to Hardin’s hypothesis and has been called “anti-tragedy” scholarship (Goldman 1997). Hardin’s hypothesis was founded on a set of “extreme assumptions” (Ostrom 1990 pp 183), making predictions that hold in a potentially small set of cases. Similar simplistic assumptions are made by game theorists in the mathematical puzzles they devise to analyze specific scenarios where actors make independent decisions in interdependent situations (Dawes 1980; Rapoport & Chammah 1965).

In practice, resource users do not often operate in isolation, and instead make collective decisions about resource use and management (Sandler 1992). Self-organization for joint benefit was originally termed collective action by Mancur Olson (1965), a concept which, surprisingly, he systematically rejected throughout his lifetime, considering it improbable in all but the smallest user collectives (Olson 2002). Commons theory is based on the expectation that individuals who have the potential to interact with each other will do so, especially to “obtain continuing joint benefits even when all face temptations to free ride, shirk, or otherwise act opportunistically” (Ostrom 1990 pp 29). In the face of resource depletion, local, self-determined institutions for management often emerge, even in the face of selfish actors or free riders.

The digital library of the commons9, a database of commons institutions, now has thousands of practical examples of successful resource governance regimes not based in state control or privatization (Castle 2009), with references hailing from agriculture, forestry, and even non

9 Digital Library of the Commons http://dlc.dlib.indiana.edu/
traditional commons like ideas and intellectual property (Hess & Ostrom 2003). The universe of commons scholarship is in a state of continuous expansion, now including the likes of email and the internet as manageable common-pool resources (Melville et al. 2006).

3.3 The ‘fisheries crisis’, marine commons, and MPAs paradigms

A common misconception is that all fishery resources are de facto open access and therefore especially prone to Hardin’s tragedy (Clark 1980; Hardin 1968; Jentoft 2000). For that reason open-access resource dilemmas have long been referred to as the ‘fisherman’s problem’ (McEvoy 1986). Today commercial and artisanal fisheries are involved in high stakes competition for global fisheries resources; a devastatingly complex scenario fueled by astronomical subsidies, technological advances and poverty (Clark et al. 2005; Newton et al. 2007; Pauly et al. 2002). It is rapidly becoming clear the fish are not open-access resources, particularly as governments act to curb unauthorized use (Mora et al. 2009). In addition to examples of government top down control, numerous empirical examples small scale fisheries collective management action have influenced the development of commons theory (Grafton 2005) (Basurto & Ostrom forthcoming; Berkes et al. 2006; Grafton 2005; Ostrom et al. 2007).

In many societies around the globe, fishers have developed complex collective action governance institutions to prevent overexploitation. Fishers in Turkey form fisher co-ops which partition prime fishing spots among its members to control site based competition (Berkes 1986). Chisasibi Cree fishermen in Canada divide fishing areas into family units and control harvest through seasonal and yearly rotational cycles (Feit 1973). The Seri people of Northwest Mexico have developed rules which dictate who can enter the fishery and how much each member can harvest (Basurto 2005). These case studies are not just isolated exceptions to an open-access or government control global fisheries norm. There are vast geographical regions where self-regulation and collectively managed marine use is commonplace.

Village-managed coastal fisheries in the Pacific Islands present a prime example of how communally held resources may be governed by institutions that are neither based in government control or private property (Larmour 1997; Wagner & Talakai 2007). The social and political institutions operating within many Pacific Island communities are themselves the very definition of collective action regimes; users form small village-level collectives and self-control marine use and restrict access to non-members (David & Cillaurren 1992; Hviding 1998; Hyndman 1993). For many villages, particularly in the archipelago nations of the Solomon Islands and Vanuatu, the central government is often little more than a far-removed entity; little respected if not out rightly rejected (Bonnemaison & Penot-Demetry 1994; Premdas & Steeves 1984). Commons theory may therefore be well placed to investigate the collectively determined institutions of marine governance in this region.

A key focus of commons scholarship has been to delineate the shared characteristics of successful commons institutions (Ostrom 1990), and the conditions which enable their emergence (Ostrom 2002). Commons theory may provide an insightful perspective about community-based marine reserves in Vanuatu because it considers the influence of contextual factors on governance, and does not assume exploitative human behavior and selfish “internal calculation processes” (Ostrom 1990 pp 193). Investigating and contrasting the contextual
factors associated with each diverse type of MPA established by ni-Vanuatu communities will enhance our understanding of how and why closures are designed, implemented and ultimately successful. However, before a commons theory framework is adopted here to organize and analyze research on MPAs in Vanuatu, it is critical to evaluate whether commons theory is, in fact, suitable to evaluate the collective action regimes in developing country contexts like Vanuatu. To evaluate commons applicability, relevant critiques of commons theory are reviewed and opportunities to improve current frameworks are explored.

3.4 Limitations of commons theory for MPA research in Vanuatu

3.4.1 Commons discourse

‘Commons’ and ‘collective property’ ideologies have recently been evoked by ni-Vanuatu people themselves in internal discussions about natural resource management. This fact suggests that a commons-derived framework may be an appropriate tool for investigating Vanuatu’s community-based marine closures. At the Vanuatu Indigenous People’s Forum held in 2007, the delegates approved the Lavatmagemu Declaration which in part read:

"Natural resources include every “global commons” that are for us to share as a universal collective, including wind, air, stars, different planets, different worlds, the sun, the moon and our planet. Natural resources also include the collective property, which we strive to look after on behalf of the tribal generations from each area, including the sea, reef, land, and everything underneath, inside and above them."

Within this declaration one finds reference to common-pool goods, human management institutions, and links between social and ecological systems. However commons theory has been critiqued in its application to the South Pacific and other developing regions; critiques which must be acknowledged and mitigated before a theoretical framework is accepted here. These critiques include 1) the primacy of property rights, 2) use of powerful metaphors, 3) static systemic models, 4) inattention to social justice, 5) and apolitical analyses. In the next sections, each of these critiques is considered and addressed separately.

3.4.2 Primacy and complexity of property rights

Due to its origins in the private versus open access property debate, contemporary commons scholarship retains an innate connection to property ownership questions (Adams et al. 2002). But, the centrality of property rights in studies of common-pool goods represents a “misplaced analytic focus” (McCay & Jentoft 1998). 'Common' refers to the nature of the good, and not to the human institution of property rights (Ostrom et al 1994). While fallible property right regimes may be the cause of environmental degradation in some cases, power relationships, population growth or technological evolution may better explain outcomes in others (Frankel & Rose 2005; Goudie 2006; Urdal 2005). In the Pacific Islands for example, sea-level rise, cyclones, volcanic activity, population pressure, invasive species, tribal fighting, weak central

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10 Najerel Risos emi inkludim evri ‘global commons’ we iblong iumi tuketa we iumi searem universe ia oseim win, air, ol sta, ol difren planet, ol difren wol, san, mun mo planet blong iumi. Najerel risos emi includim tu ol kolektiv proptei we ol traeb oli lukaotem long behalf blong ol traebol jeneresen long wanwan eria we oli stap oseim solwora, rif, kraon mo evri samting we igat andanit, insaed mo antap long kraon.
governments, and poor ecological and commercial monitoring have all been implicated in Pacific Island natural resource declines (Crosby et al. 2002; Hunt 1996; Wilkinson 1999; Wright & Hill 1993).

Global property ownership scenarios are too diverse and uniquely expressed to be classifiable into clearly defined categories like open access, common or private (McKean 1992), particularly in customary ownership contexts. In Australia, for example, aboriginal property ownership and land tenure regimes are based on spiritual affiliation, where “land is not measurable in mathematical terms, nor delineated through the mapping or textual mediums of a western society” (Brazenor et al. 1999 p 3). There also, songlines representing ancient ancestral journeys across the continent, bestow use and stewardship rights to places thousands of kilometers away from an individual’s home area (Chatwin 1987). Among the lowland forest dwellers of Amazonia, property rights are communally held by the tribe. They perceive the extent of their land and resources to be “fluid and indeterminate” (Davis & Wali 1994). In Ghana, land rights are also held and defended by communal kinship-based groups (Gyasi 1994).

A diversity of tenure and property ownership regimes can also be found in the Pacific Islands. Carrier and Carrier (1983) observed highly complex and economically driven systems of tenure in Papua New Guinea and Aswani (1999) note several differing types of resource ownership regimes operating within a single region of the Solomon Islands. Wagner and Talakai (2007) argue that the complex historical and contemporary tenure regimes of the Pacific are not “captured by the overly neat categories of private, common or public property”, but have “simultaneous, multilayered sets of rights, both communal and individual”. Tanner (2007) argues that for Fiji, “common property concepts do not merely gloss over minor inconsistencies, they fundamentally misrepresent how the system works.”

To conceptually move beyond this critique, it is important to explicitly define how the term commons will be used in this dissertation. In lieu of the more widely cited, but misinterpreted term 'common property resource', hereafter the term common-pool resource (CPR) will be applied to resource units independent of the property-rights regime which governs them (McCay 1996; Ostrom 1990). Recognition of this shifted discursive and analytical frame is required if commons theory is to be appropriately utilized in the Pacific Islands. To be considered common pool, resources must possess two characteristics:

1) the resource system produces a limited supply of resource units, and use by one individual will subtract from the quantity available to others and

2) there is a cost associated with excluding potential beneficiaries

In other words a common pool resource is intrinsically different from a public good because it is both nonexcludable and subtractive (Cornes & Sandler 1996; Ostrom & Ostrom 1977).
3.4.3 Powerful metaphors and universal panaceas

While recent commons work highlights the diversity and complexity of collective choice governance regimes around the world (Dietz et al. 2003), much of the early literature indirectly (and often unintentionally) promotes a universal commons governance panacea. Take for example the language utilized by Ostrom to describe the set of commonalities among institutions that sustain CPRs: design principles (1990). Because commons discourse has utilized powerful metaphors in the past, there exists the potential to misrepresent the complexity and diversity of local systems (McCay & Jentoft 1998). It has since been argued that developing lists of universally important conditions enabling successful management regimes is “flawed” and “costly, and there is likely little possibility for a universal theory of the commons (Agrawal 2001; Agrawal & Chhatre 2006). Although Ostrom explicitly refutes the suggestion that her design principles are necessary requirements for all successful CPRs (Ostrom 1990 pp 90), the implication remains that collective choice systems will be improved as more principles are met.

3.4.4 Systemic dynamism

Ostrom specifically states that her model is designed to examine systemic interactions and outcomes “achieved at a particular time and place” (Ostrom 2007 pp15182). However the framework is unable to consider insights from the system’s historical trajectory over time. Understanding from whence a system has evolved will help predict where it is headed; vital for improving the future resilience of marine governance regimes (Hughes et al. 2005; Levin & Lubchenco 2008). A snapshot or ahistoric viewpoint may miss important aspects of contextual change that explain the existence of complex collective choice arrangements (Luzadis et al. 2002). Commons analyses tend to ignore or dismiss the dynamic shifts that institutions experience over time (Scoones 1999). Agrawal (2003) suggests that one of the most neglected aspects of commons research is “the changing relationship between the environment and human beings”.

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**Figure 6 Conceptual model for classifying goods and common-pool resources.** Adapted from (McKean 2000 pp29) and (Ostrom et al. 1994 pp7). The questionable fish highlights the complex nature of fisheries ownership rights and marine tenure regimes in the Pacific Islands.

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11 A management panacea is a cure all solution for all problems. Some questiona remain as to whether marine protected areas are applied strategically or as cookie cutter type panaceas to complex problems (Kaiser, 2005).
In response to these criticisms, commons theory has been moving towards a more dynamic focus on collective choice institutions (Cleaver 2000; Ray 2006). It is not unusual for commons empirical practitioners to explicitly push further outward in space or backwards in time in their case studies (Vayda 1987). Post modern commons scholars, as they have been called, study governance institutions in “particular intersections of history, politics, culture, time and space” (McCay & Jentoft 1998), often describing the shift towards temporal dynamism using the terms “thin” and ‘thick’. Thin commons frameworks are generalizing models, only cursorily recognizing historical continuity, while thick frameworks are more ethnographic, emphasizing a system’s embeddedness within changing social and political contexts (Geertz 1994; McCay & Jentoft 1998). Although data generated from this kind of thick commons research will be more complex and difficult to analyze, results will undoubtedly be more authentic and explanatory. Taking a thicker perspective of social-ecological systems will help overcome these critiques.

3.4.5 Social justice

*Until the lions have their historians, tales of hunting will always glorify the hunter.*

-African proverb

A principal assumption of commons theory is that the rules or institutions governing resource systems can be manipulated to yield increasingly more effective alternatives (Hanna et al. 1996; McKean 1992). By highlighting commonalities among successful regimes, the commons remedy for failed management is often (albeit tacitly) to change local institutions (Ostrom 1990 pp 192). However, manipulating or prescribing changes to collectively determined local institutions strikes a dissonant chord among those who work towards a post-colonial and egalitarian world order (Loomba 1998; Smith 1999). Commons scholarship, and its potential links to social engineering, has been decried as an affront to the fundamental right to self-determination of local people, a ‘disenfranchisement’ as communities lose control over their own governance destiny (Giddens 1990). Goldman (1997) caustically suggests that “the commons debate is worth mining for explanations of new forms of social control…a hidden and not-so-hidden institution of domination and imperialism.”

Bearing these criticisms in mind, commons theory may yet offer insights into collective choice marine management rules, so long as it maintains conscious concern about the social justice implications of knowledge acquisition and institutional recommendations. Social consciousness in commons research is particularly important when dealing with cultures like those in Vanuatu, which have been marginalized by two centuries of colonial policies (Firth 2000). Rather than practicing one-sided learning about or implementation of ‘ideal’ governance regimes, a participatory approach to exploring commons institutions could lead to more equitable and lasting solutions.

3.4.6 An apolitical and acultural theory

Commons theory has been criticized because its analytical assumptions are often “culture-free” (Tanner 2007) or apolitical (McCay & Jentoft 1998; Wagner & Talakai 2007) despite widespread acknowledgement that institutions are socially and politically embedded (Agrawal 2003; Campbell et al. 2001; Peters 1987). For example, the Ostrom diagnostic framework
(Ostrom 2007) only considers political settings as an externality to the focal social-ecological system. Accordingly, Agrawal suggests that commons theory will become more valuable if it “loosens” its assumptions about the apolitical nature of collective choice institutions (Agrawal 2003). Commons models could be improved by explicitly considering the contested meanings, definitions and politics of human actors within which institutions are situated (Peters 1987). In order to move beyond these critiques it may be possible to temper the traditional commons theory with an approach known today as political ecology.

3.5 Political ecology; deepening Commons research

The phrase ‘political ecology’ was first used by Eric Wolf in 1972 in an attempt to move away from “static analysis” of real-world systems, and instead offer a dynamic view of human-environment interactions (Wolf 1972). The contemporary field of political ecology however owes its methodological and ideological foundations to the work of Piers Blaikie and Harold Brookfield with their seminal publication, *Land Degradation and Society* (1987), in which they examine the human dimensions of environmental change in the context of developing country inequalities. Their analysis explicitly focuses on a combination of property ownership, historical legacies, economic disparity, and other social, ecological and political contextual factors.

Rather than representing a new theory, political ecology is an “historical outgrowth of the central questions…about the relations between human society and a significantly humanized nature” (Greenberg & Park 1994). As an approach that explicitly considers social and ecological influences on systems, political ecology can be a useful tool for expanding the number and breadth of factors commonly considered in traditional commons research (Cumming et al. 2006). Political ecological approaches fit well with the need to consider local and global knowledge and contexts because it explicitly examines “the influence of variables acting at a number of scales, each nested within another, with local decisions influenced by regional policies, which are in turn directed by global politics and economics” (Robbins 2004 pp. 11). Political ecological approaches actively scale up issues from the local level to the global in a process of ‘progressive contextualization’ (Vayda 1983).

Using political ecological approaches will help mollify the social justice critiques of existing commons theory, particularly because political ecology has often been explicitly used as a practical tool by which inequalities in the developing world are rectified at the policy level (Bryant 1998; Forsyth 2008). This is done by political ecological practitioners by consciously investigating the realities of marginalized populations, groups and individuals and by “giving voice” to an often silent demographic (Keys 2005). While not referring to any specific tool or theoretical framework, political ecology is an ethical commitment and practice (Jarosz 2004), intended to liberate knowledge generation and research from constraints of political or economic inequality (Peet & Watts 2004). The political ecological approach has been dubbed a postcolonial ideological “hatchet” (Robbins 2004) with which to “deconstruct” the colonial-esque researcher-subject paradigms of science (Nygren & Rikoon 2008).

Like recent attempts by commons theorists to integrate social and ecological components of complex systems, political ecology explicitly acknowledges the link between ecological
outcomes and human systems. The approach has historically lent itself to multidisciplinary methodologies which often enhance the “explanatory power” of the case studies it considers (Keys 2005). Political ecological approaches specifically require that ecological methodologies are considered alongside those of the social sciences, including the analysis of commons institutions (Neumann 2008). It is therefore a commons extension. Ultimately Brookfield and Blaikie (1987) sought to create an interdisciplinary academic space that acknowledges the “constantly shifting dialectic between society and resources.”

However, one of the most significant criticisms of political ecology is its lack of a theoretical underpinning. It has been described as a ‘part-theory’ and ‘discipline without an institutional home’ (Wolford 2005). Alternatively considered, its “woolly incoherence” (Peet & Watts 2004), could in fact present the flexibility that is required to successfully integrate social-ecological investigations of MPAs. Without being bound by any one set of disciplinary approaches and methodologies, it may guide commons researchers towards minimizing the theoretical shortcomings of both marine ecology and commons theory. If used, it should not however privilege political factors over other social or ecological factors (Nygren & Rikoon 2008; Peterson 2000; Vayda & Walters 1999; Walker 2005). To do so may alienate natural scientists and further prevent interdisciplinary dialogue (Neumann 2008).

3.6 Connecting paradigms for commons-based MPA investigations

Investigations into marine protected areas are disproportionately influenced by ecological theory. Since Darwin published his On the Origin of Species in 1859, ecology has focused on what he called nature’s “web of complex relations”, or the processes of competition and interaction between biotic and abiotic elements of nature (Hagen 1992). In marine environments, the connectivity and interactions among these elements is particularly complex due to the open nature of marine populations (Cowen et al. 2000) and therefore the traditional role of marine scientists is to design MPAs that are best able to effectuate desirable ecological outcomes in these complex open systems (Roberts et al. 2003b). The contextual variables they consider include size, spacing, ecological representativeness, duration etc. and these often attempt to consider the vast scales of connectivity within marine systems (Palumbi 2003; Roberts et al. 2003a).

On the other hand, commons scholarship has largely been underpinned by social, economic and institutional theories. For example, in her seminal 1990 work, Governing the Commons, Ostrom proposed the existence of eight design principles for successful commons governance regimes including clearly defined boundaries, congruence with local conditions, collective choice arrangements, monitoring, graduated sanctions, conflict resolution mechanisms, legal support, and nested enterprises. The contextual variables the principles encompass do not include ecological factors, and each may operate on a very localized scale, much smaller than is often necessary to match marine connectivity. In Agrawal’s review of the conditions suggested by commons theorists to enable successful regimes (2001), it is clear that the group of variables considered by commons practitioners is highly skewed towards the social sciences (see Table 1 below).
Table 1 Summary of the factors assumed to be critical to the successful governance of common-pool resources (Agrawal 2001). RW-(Wade 1988) EO-(Ostrom 1990) B&P-(Baland & Plateau 1996)

<table>
<thead>
<tr>
<th>Resource System Characteristics</th>
<th>(i) small size (RW)</th>
<th>(ii) well-defined boundaries (RW, EO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Characteristics</td>
<td>(i) small size (RW, B&amp;P)</td>
<td>(ii) clearly defined boundaries (RW, EO)</td>
</tr>
<tr>
<td></td>
<td>(iii) shared norms (B&amp;P)</td>
<td>(iv) past successful experiences - social capital (RW, B&amp;P)</td>
</tr>
<tr>
<td></td>
<td>(v) appropriate leadership (B&amp;P)</td>
<td>(vi) interdependence among group members (RW, B&amp;P)</td>
</tr>
<tr>
<td></td>
<td>(vii) heterogeneity of endowments, homogeneity of identities and interests (B&amp;P)</td>
<td></td>
</tr>
<tr>
<td>Relationship between System and Group</td>
<td>(i) overlap between user location and resource location (RW, B&amp;P)</td>
<td>(ii) high dependence on resources (RW)</td>
</tr>
<tr>
<td></td>
<td>(iii) fair allocation of benefits from resources (B&amp;P)</td>
<td></td>
</tr>
<tr>
<td>Institutional Arrangements</td>
<td>(i) rules are simple and easy to understand (B&amp;P)</td>
<td>(ii) locally devised access and management rules (RW, EO, B&amp;P)</td>
</tr>
<tr>
<td></td>
<td>(iii) ease in enforcement of rules (RW, EO, B&amp;P)</td>
<td>(iv) graduated sanctions (RW, EO)</td>
</tr>
<tr>
<td></td>
<td>(v) low cost adjudication</td>
<td>(vi) accountability of monitors to users (EO, B&amp;P)</td>
</tr>
<tr>
<td>Relationship between Resource System and Institutions</td>
<td>(i) match restrictions on harvest to regeneration rates (RW, EO)</td>
<td></td>
</tr>
<tr>
<td>External Environment</td>
<td>(i) low cost technology (RW)</td>
<td>(ii) state</td>
</tr>
<tr>
<td></td>
<td>(iii) local authority not undermined by state (RW, EO)</td>
<td>(iv) supportive external sanctioning (B&amp;P)</td>
</tr>
<tr>
<td></td>
<td>(v) appropriate external aid for conservation (B&amp;P)</td>
<td>(vi) nested levels of appropriation, provision, enforcement, governance (EO)</td>
</tr>
</tbody>
</table>

Failure to consider both the social and ecological components of complex resources systems has been implicated in the widespread breakdown of environmental management regimes around the world (Berkes et al. 1998). Once acknowledged, a fundamentally different approach to resource management investigation was required; one that could integrate a holistic systems approach to ecosystem studies (Holling 1978; Walters 1986) as well as the people-oriented approach of institutional theory (McCay & Acheson 1987; Ostrom 1990). An approach was needed that could reverse the long acknowledged, pervasive and Western driven notion that humans are somehow separated from nature (Berkes et al. 2003; Nelson & Serafin 1992). It is only recently that the potentially valuable contributions of social science to investigations into
MPAs have become widely acknowledged (Mascia 2003, 2004). However the social science contributions to MPA investigations continue to be ad hoc and often not embedded within multi-disciplinary frameworks.

### 3.7 Integrated social-ecological frameworks

Improved understanding of the interactions between social and ecological components of complex systems is a critical priority for MPA research and ecosystem-based management more broadly. To date however, diagnostic analyses and cumulative learning have been hampered by the lack of a common theoretical framework to organize the large number of potential variables involved and their interactions. Frameworks are the broadest level of conceptual organization (Koontz 2003), and should provide “intellectual scaffolding” on which variables from multiple disciplines and theories can be placed and related to or contrasted with one another (Schlager 1999).

New diagnostic frameworks have recently emerged for investigating the interplay between key components of social-ecological systems (Anderies et al. 2004; Ostrom 2007). One of the most widely cited frameworks for examining commons institutions within social-ecological systems is the Institutional Analysis and Development (IAD) framework. It has been applied to frame specific questions about metropolitan organizations, public goods, infrastructure in developing countries, and common resource dilemmas (Ostrom et al. 1994). However, while the developers of the IAD framework include the physical world as a component of the system, they specifically state that the framework provides a common language that “any other social scientists” might want to use (Ostrom et al. 1994 pp 27).

![Figure 7 Schematic of the IAD framework from (Koontz 2003)](image)

Acknowledging that the IAD framework is socially focused, and does not equally consider biophysical or ecological components of complex systems, Ostrom later published a multitier framework to better approximate the integrated nature of linked social-ecological systems (Ostrom 2007). She argues that in order to build on the field of sustainability science, it is critical to include work on “ecological systems, socioeconomic systems, and linked SES” (Ostrom 2007 pp 15181). In her model of a complex system, she suggests that elements of the resource system (e.g. pasture), the resource units (e.g. fodder), the users (e.g. farmers), and the governance system (e.g. harvest rules) jointly affect and are indirectly affected by the interactions among components (e.g. conflicts or cooperation) and the outcomes that result (e.g.
increased productivity). Like other recent attempts to place social-ecological systems within scaled contexts (Berkes 2008), she embeds the focal system within broader social, economic and political settings (e.g. state government policies) as well as within related ecosystems and processes (e.g. climatic patterns).

Recall the criticism that commons theory promotes policy panaceas. In response, Ostrom has recently forwarded a multtiered framework to enable researchers to build nested conceptual maps of key local variables (2007). Within the framework, locally relevant variables can be scaled-up and the interactions between them used to formulate hypotheses about other social-ecological systems. The factors included in the framework are hierarchal, allowing for the locally-relevant unpacking of variables important to the case at hand. The framework itself does not make value statements about the importance of any one contextual factor over any other. The structured nature of the framework is intended to allow studies conducted at different scales and in different geographical, social, cultural, environmental and political contexts to be theoretically contrasted. From this kind of commons framework, one does not “derive a precise prediction” or a policy panacea (Ostrom 1990 pp 192), but rather one is able to consider local specifics in determining appropriate management. Using a scaleable framework also helps avoid the analytical trap of considering each case as unique (Basurto & Ostrom forthcoming), within which cumulative theories cannot be developed from empirical results.

Figure 8 Simple model of a complex social-ecological system from (Ostrom 2007).
Figure 9 A hierarchal diagnostic framework for examining the theoretical and empirical relationships between components of complex social-ecological systems (SES) designed by Ostrom (2007). Particularly useful for “unpacking” theoretical concepts down to locally relevant scales and variables and vice versa.

Social-ecological frameworks like the IAD and SES diagnostic tool have been applied to examine water management, fisheries, and forestry systems, but have not yet been applied to MPAs (Gibson et al. 2000; Meinzen-Dick 2007; Rudd 2004). In this context, there is an urgent need to begin theoretically situating studies of MPAs within linked social-ecological systems frameworks. Situating MPAs within a social-ecological systems framework allows investigators to simultaneously and theoretically investigate the variables and interactions that are critical to marine ecology (e.g. size, connectivity, biomass, habitat complexity etc) as well as those variables critical to social science (user characteristics, institutional structures, government policies, poverty etc). It is expected that an adapted version of this commons theoretical framework will better organize MPA research and facilitate the development of novel research questions that bridge disciplines, theories and methodological approaches.

### 3.8 Moving beyond limitations; a hybridized multi-disciplinary approach

Despite the potential limitations of commons theory and political ecology highlighted above, each has been useful for challenging orthodox assumptions about the way complex social and ecological systems function and change over time. There is no single approach or an “everything pill” able to magically and successfully analyze all social-ecological scenarios (Robbins & Bishop 2008). Rather than reject outright existing frameworks because they have minor and nonfatal flaws (e.g. Greenberg & Park 1994), it may be possible to incorporate tenets of each to create a hybridized, yet theoretically grounded, approach to addressing questions about MPA in general and Vanuatu’s contemporary closures in particular.
Presented above is a model of MPAs as a component of a linked social-ecological system, based on Ostrom’s diagnostic framework (Ostrom 2007). This modified framework enables a structured analysis of how MPA outcomes are influenced by components of the linked social-ecological system, including the users themselves, the governance system, the social, economic, and political setting, characteristics of the resource system (e.g. coral reefs), characteristics of target resources (e.g. mobility of target fish species), the governance system (e.g. MPA operational rules) and interactions between components.

The framework presented above explicitly acknowledges the critiques and limitations of existing commons theoretical frameworks. Importantly this adapted framework internalizes social, economic and political settings by considering them as endogenous to the focal system, rather than considering them as externalities. Following a political ecological approach, the framework highlights the importance of cultural practices, customs, indigenous identities and social justice concerns to commons research in general and MPA research in particular. By explicitly acknowledging the complex nature of tenure and property ownership regimes, it may enable commons to finally break its reputation as a property-dominated discipline. Most importantly, the framework presented here will allow us to examine conditions relevant to Vanuatu’s MPAs, but scale up findings so as to be theoretically comparable to and incrementally improve understanding of other social-ecological systems.
Utilizing this social-ecological system framework will help MPA studies focus on critical variables, and 'control for' others not deemed directly relevant (Ostrom 2007). This will be the case in MPA ‘natural experiments’ (Banana & Gombya-Ssembajjwe 2000), such as those on Nguna and Pele where communities either choose no-take MPAs or alternatives. Theoretically important variables, like different MPA operational rules, distance to market, and environmental conditions, can be ‘held constant’ to study the variability in other, more locally relevant, variables. Accordingly the framework enables the design of robust and structured case study comparisons, the lack of which Agrawal (2003) suggests is constraining Commons theoretical development.

Utilized as a guide alongside research methodologies that internalize social justice issues (Low & Gleeson 1998), the framework allows an integrated and multi-disciplinary approach to investigate complex multi-scalar problems (Cohen & Harel 2007; Esbjorn-Hargens & Zimmerman 2009; Hughes et al. 2005). In essence, this theoretical orientation aspires towards Goldman’s calls for a “successor science” (1997), able to examine collective action dilemmas within complex and contested hegemonic cultures.

3.9 Summary

This Chapter begins by considering the orthodox paradigms of marine governance (e.g. state led and controlled limits over common ownership etc), and then contrasts these with the much more common alternative to state control or strict privatization: collective tenure. The chapter examines in detail how throughout the world, small groups like families and communities have been collectively utilizing and managing coastal marine resources. Of course, not all of this management has been geared towards sustainable outcomes. Much marine utilization has been for short-term gain, leading to what is now globally recognized as a ‘fisheries crises’. Overexploited and collapsed stocks have led many communities, governments and individuals to declare marine protected areas over all or part of their tenure area. The issue of marine protected areas establishment and enforcement is essentially a commons problem, how to manage a resource that is difficult or impossible to ‘fence off’ and one person’s use subtracts from that which is available for others. This Chapter also makes a case for why Commons Theory may hold only limited traction for answering questions related to Pacific Island MPAs where communities can effectively exclude others from their reef tenure areas through physical and cultural enforcement. Other theoretical approaches are considered, including Political Ecology which can add depth to the analysis of MPAs by incorporating factors like historical trajectories and political contexts. Finally this Chapter describes an integrated and theoretical approach, based on Elinor Ostrom’s diagnostic framework for linked social-ecological systems, but that more fully incorporates elements of culture, politics, social justice and historical context.

In each of the following chapters of this dissertation, several variables important to Vanuatu’s MPAs are highlighted and the relationships between those variables are explored. At the end of each chapter I will place findings into the adapted framework to 1) theoretically situate critical variables within a model of complex MPA systems and 2) promote broader scale learning and comparison with other linked social-ecological systems.
CHAPTER 4 - EPISTEMOLOGICAL AND METHODOLOGICAL APPROACHES

“The rules of scientific method as set out by logicians do not correspond to the reality of scientists’ practices. As in other professions, scientists take for granted that the existing theories and methods are valid...they work not to discover new theories but to solve concrete problems.” (Bourdieu & Nice 2004 p 15)

4.1 Indigenous knowledge and ways of knowing

“To successfully build new epistemic foundations, accounts of innovation and experimentation must bridge the indigenous/Western divide” (Agrawal 1995 p 4)

The grounded theory approach recommends an examination of problems in terms of local realities; not just from *a priori* scientific hypotheses (Charmez 2006; Strauss & J. 1998). The political ecology additions to the commons theoretical frameworks discussed in the previous chapter helps to epistemologically ground this investigation by explicitly examining the generation and evaluation of knowledge. A "traditional" versus "Western" knowledge dialectic is widely promulgated within Vanuatu today, where communities establishing marine protected areas are accused of “ignoring much of the richness and usefulness of the traditional ecological knowledge held by the First Nations regarding their resources.” (Hickey 2001 pp 135). Thus, before the empirical methodologies and results of this dissertation can be appropriately presented, I briefly review the meaning and use of the phrase ‘traditional ecological knowledge’.

Traditional ecological knowledge (TEK) is a phrase that has been largely championed by Fikret Berkes and others since the 1980’s (Berkes 1989; Berkes 1993), and defined (in 1999 pp 8) as:

> “a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment”.

This definition is necessarily broad; it covers knowledge that potentially originates from any corner of the globe. Importantly however, the definition does not specify the specific content of the knowledge, practices or beliefs that are handed down through generations. Nor does the definition presented above argue that TEK is accurate, valuable, ecologically relevant or socially beneficial. The early noble savage debate has done much to coat discussions about indigenous environmental relationships and TEK with a veneer of ecological balance and harmony (Redford 1991), despite empirical evidence in many cases to the contrary (see Brush 1993; Diamond 1993; Vitousek et al. 1997) (also see Chapter five). Commons researchers have long struggled with the assumed conservation-enhancing nature of TEK, for example when Baland and Platteau (1996) concluded that rural communities are not “inherently conservationists” despite colloquial claims to the contrary.
The late Robert Johannes repeatedly found a disinclination among Pacific elites to acknowledge that there are “traditional maladaptations” among non-Western cultures. He also observed a propensity among many groups to “maintain the fiction that all cultural practices are beyond censure except Western cultural practices, which often seem to rank well beneath the rest” (Johannes 2003). This is particularly true in Vanuatu where academics risk being denied travel visas and research permits for not explicitly investigating ‘traditional’ practices (Johannes 2003 pp 121). However, the word traditional excludes much of the knowledge used and generated by ni-Vanuatu island people today. To them, knowledge is more a tool for every day life and survival, and is not divided into that which is traditional and that which is not.

Avoiding the ambiguity and unrealistic meanings surrounding the word traditional, some have replaced it with the term indigenous (e.g. Chambers et al. 1989b; Warren 1995). However, this terminology creates an artificial distinction between indigenous and ‘Western’ ways of knowing (Cochran et al. 2008). Agrawal (1995) makes a case against such a dichotomy as belittling and disempowering to all parties. He suggests that a Western/indigenous-traditional dichotomy forces us to ignore the possibility that indigenous ways of knowing change, adapt and blend with ‘other’ knowledge. Knowledge is neither ancient nor static, but actively reincarnated and rejuvenated with each generation, even if it may have deep historical roots (Houde 2007). Others suggest using the phrase local knowledge. Ignoring local knowledge has been shown to result in failure of business ventures, development and even research (Brokensha et al. 1980; Johannes et al. 2000). But even the phrase local knowledge is subject to the same critiques as above. The phrase local knowledge suggests that a body of knowledge originates from a single, limited geographic area (e.g. Ruddle 1994).

In order to avoid discursive confusion, here I propose the phrase ‘contextual social-ecological knowledge’ to describe the diverse values, beliefs and practices people hold regarding living and non-living things within variable contexts. The scope of the definition can be narrowed to the context of a single clan on a single island, or broadened to encompass the entire human race. The phrase does not discriminate on historical, ethnic or geographical origin of knowledge but incorporates each under its theoretical umbrella. One may further employ qualifying words such as localized (pertaining to a certain geographical area), emic/etic (within/external to a group), or indigenous (characteristic of or originating in a particular cultural system) to explicitly describe the context of the knowledge system. Inherent in this phrase is a call to valorize knowledge within the specific context it is being discussed.

In essence, this dissertation seeks to acquire specific contextual social-ecological knowledge about marine protected areas in Vanuatu. It values knowledge that originates from the islands of Nguna and Pele, but also that which has arrived from other islands in the archipelago or even overseas. It considers knowledge that has many generations of historical roots in Nakanamanga culture as well as that which is recent and has little time depth. Most importantly, this dissertation seeks to acquire knowledge from both an emic Melanesian point of view and an etic external perspective. Contextual social-ecological knowledge is likely what directly drives individuals and communities to act, and even implement marine protected areas. This is the type of contemporary, every-day, real-life knowledge I sought to obtain during the course of this research. In order to collect and convey this type of knowledge about MPAs in Vanuatu I was forced to critically consider and adapt the available methods of enquiry.
Johannes observed in the Pacific that although “colonial bodies are being replaced, scientific colonialism lingers” (Johannes 2003). This critique is underscored by a large body of literature on the colonial style domination of knowledge acquisition and transfer prevalent in Western science (e.g. Bishop 1998). In a typology of research paradigms, colonial research has been defined as “reflecting and reinforcing domination and exploitation through the attitudes and differential power embodied in its research relationships with others” (Howitt & Stevens 2005 pp 32). In general this relationship plays out as an expert (usually Western) researcher extracting knowledge from or teaching a powerless (usually non-Western) layman. Often from the indigenous perspective, research is “so deeply embedded in colonization that it has been regarded as a tool only of colonization and not as a potential tool for self-determination and development” (Smith 2005 pp 87).

In response, many socially conscious academics have started to practice what has been labeled ‘post-colonial research’. Howitt (2005) defines post colonial research as a “reaction to and rejection of colonial research” that will in turn contribute to self determination. He suggests that the research process itself can be utilized to break down the “asymmetrical power relationships and representations…through which colonial ideas are constructed and maintained.” A practical challenge of this dissertation research therefore was to design and implement a methodological protocol that made tangible inroads into decolonizing the researcher-subject academic tradition, but that also allowed for the possibility that my own knowledge system could enhance and influence the process.

In Vanuatu this goal is particularly important because the country has been the scene of centuries of unjust relations between ‘masters’ and islanders (see Chapter seven). To guide my own research, I relied upon several outstanding examples of balanced and decolonizing research conducted with communities in Vanuatu including Joel Bonnemaison’s work with the Tannese (Bonnemaison & Penot-Demetry 1994), Margaret Jolly’s work with the communities on South Pentecost (Jolly 1984), and Bob Tonkinson with the people of Ambrym (Tonkinson 1985). Interestingly each of these mentors worked in the fields of anthropology and cultural studies, none in marine ecology.

In general, post-colonial investigators seek to engage in research that adresses real world problems for real word people (Brown & Tandon 1983); in other words the process begins not with a literature review, development of hypothesis and selection of a subject group, but in reverse. On that account, at least, this current dissertation is based on a project where questions were locally-relevant and indeed, locally asked from the very outset. Inclusion of stakeholders in the research process is another step towards decolonizing research, a methodological option covered by entire disciplines of participation in research including ‘participatory research’ (Cornwall & Jewkes 1995; Hall 1981; Stoecker & Bonacich 1992), ‘participatory action research’ (Fals-Borda & Rahman 1991; Kemmis & McTaggart 2000; Selener 1997), ‘participatory rural appraisal’ (Chambers 1994; Mosse 1995; Mukherjee 1993) ‘action research’ (Brown & Tandon 1983; Cunningham 1976; Lewin 1946) and most recently ‘feminist research’ (Acker et al. 1996; Hesse-Biber et al. 2006; Lather 1991). Although there are fine scale
differences among each of these approaches (Reason 1994; Reason & Bradbury 2007), each centers around research methodologies that benefit and enhance the condition of participants.

While undeniably difficult to put into practice, participatory research is theoretically valuable not only to the group not experiencing scientific colonialism, but also to the researcher, who has the opportunity to generate a new form collaborative knowledge (Israel et al. 1998). The presence of an outside researcher will undoubtedly influence (positively or negatively) the knowledge generation process (Gaventa 1993; Rahman 1991), but mutual influence is often a stated goal of action research. Researchers value participatory processes because they believe in the capacity of subjects to assess their own needs (Minkler & Wallerstein 2003) and articulate local realities (Gadamer 1989). Guided by those most connected to the issues, researchers have an opportunity to learn diverse points of view (see Berkes 1999) and unique ways of thinking about pre-existing problems (Fear & Edwards 1995). Participatory research has the potential to yield greater insight than ‘expert command’ colonial research, specifically by avoiding externally developed criteria to validate knowledge (see Agrawal 1995), or using ‘expensive’ and inappropriate methods and typologies (Stoecker 1999).

There are, of course, degrees of participation in research. The cooperative management literature provides interesting examples of the continuum of shared power and responsibility (Borrini-Feyerabend et al. 2004) that could apply to levels of participation in research (see Figure 11). This dissertation could never have been achieved through a ‘purely indigenous’ research process, where all authority and responsibility was devolved to people on Nguna and Pele. What made this project so exciting to me, the NPMPA Network and my supervisors at James Cook University was its goal to cross not only disciplinary but also cultural boundaries of collaborative sharing and knowledge generation. Unsurprisingly, this approach runs against the grain of the modern scientific establishment, which is geared towards individualism and where success is measured by the number of sole-authored high impact-factor journal articles publish in a lifetime (Seipel 2003). Most investigators would feel comfortable with the “seek-consensus” level of research collaboration, but many would not recognize participants as co-authors. In this context, participatory approaches are typically only applicable to field research. Analysis, interpretation and publication often remain the exclusive domain of the expert researcher.

However an important question is whether research can empower a marginalized group if an individual researcher instigates the research and undertakes the majority of data collection and

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Figure 11 Diagrammatic representation of the various levels of co management and participation from Borrini-Feyerabend et al. 2004

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12 Expensive is the term given by ni-Vanuatu to that which is showy, flash or not of the lay person. Government employees will commonly be criticized for using ‘expensive Bislama’ or a pidgin filled with foreign words.
analysis (Gaventa 1993). If an explicit goal of post-colonial research is to empower participants, then adjustments to orthodox roles in research are required. Explicitly defining the roles of those involved in the research process (such as animator, community organizer, popular educator, participatory researcher etc) will likely help readers interpret the validity research results contained within this work. Of course it is important to keep in mind that participants will often fill multiple roles (Stoecker 1999).

To define my role in the process, I first analyzed my own skills in interpersonal communication and facilitation as a proxy for the role I would eventually play in the participatory research (Stoecker 1999). Based on this self-analysis and my past work on Nguna and Pele project, my ni-Vanuatu colleagues and I saw my role in the research process as that of a facilitator and less like a disciplinary expert. My role was to mobilize multidisciplinary knowledge and expertise to facilitate productive outcomes (Whyte et al. 1989). Having defined my role thus, it became easier to navigate the collection of contextual social-ecological knowledge from village fishermen, elders, women, youth and village leaders. Throughout however, I explicitly sought to dismantle the opposing concepts of “subject-researcher” as found in traditional research designs (Sandelowski 1986), and replace them with the concept of “speaker-listener”.

While my participation was central to the completion of this process, it was equally buoyed by technical skills and motivation of a core group of Nguna and Pele researchers and the willingness of village residents to engage with us day after day, year after year. In that sense I was no more in control of the project than any of the other participants. This role fit well with my previous one on Nguna and Pele as a development volunteer and facilitator13. Further, I explicitly sought to expand on spheres of participation traditionally occupied by researchers and participants. For example, ni-Vanuatu scholars argue that in order to avoid Johannes’ ‘scientific colonialism’ in Vanuatu, knowledge generated by research should be compiled, interpreted and shared by ni-Vanuatu themselves (Regenvanu 1999). They should be active in all phases of research including initial design to the analysis, interpretation and presentation of results (Whyte et al. 1989). Of course not every resident in each village would become fully engaged in all aspects of research design and “cogenerative dialogue” (Fear & Edwards 1995). However I sought to maintain a moral value vis-à-vis with every participant well before field data collection began and long after it had ended (Ornelas 1997).

As will be discussed in more detail in the next section, the specific research methodologies and questions on which this dissertation is based were developed in Vanuatu, alongside a representative group of residents from Nguna and Pele. Field data were collected together with a large team of Nguna and Pele researchers. Analysis and interpretation was conducted in the field by this team. Intentional nudging may best describe how my research counterparts and I related to one another during our analysis and interpretive sessions in the field (Smith et al. 1997). Together we contributed to evolving co-learning by suggesting or nudging each other in different conceptual directions. Results were presented back to communities before leaving each community.

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13 In contrast to many development organizations in Vanuatu, the US Peace Corps does not provide financial resources to volunteers or communities.
Ni-Vanuatu colleagues travelled to Australia on three occasions to present seminars and work on co-authored peer-reviewed papers. During the course of ‘writing up’ I traveled back to Vanuatu twice to re-present results to communities and get feedback from colleagues. To date I have published/submitted five articles to peer-reviewed journals and all have been written with ni-Vanuatu colleagues.

Cultivating the relationships necessary for effective research and action was not a simple or straightforward task. It is highly unlikely that a project with these epistemological groundings could have been undertaken on Nguna and Pele by anyone without long-enduring relationships and trust. In Vanuatu, as elsewhere, it takes extensive time and understanding before this type of relationship is achieved (Rahman 1991; Smith et al. 1997). Time was required well before the dissertation officially began by living, working and doing with those who would eventually become participants in this study (Sullivan et al. 2001). In the case of this dissertation, participatory research was enabled by a long-standing ‘insider’ relationship I and the research team have enjoyed with the communities considered here. Although the official period of dissertation field research only lasted 18 months, I would consider the entire process to have begun the day in June of 2002 when I first arrived as a Peace Corps volunteer.

“In the human sciences, any genuine research based on fieldwork has an emotional, and therefore subjective, component. Researchers are more likely to perceive the truth of others when that truth is closer to their own or when it touches them personally.” (Bonnemaison & Penot-Demetry 1994 pp xvi).

4.3 Invitation to undertake research

In late 2004, the Nguna-Pele MPA Network committee submitted a funding application to the US National Oceanic and Atmospheric Administration’s (NOAA) International Coral Reef Program for support to conduct a major social and ecological assessment on the effectiveness of local marine management strategies. With funding secured, the Network requested my help to devise the assessment protocol. Nearing the end of my tenure as a Peace Corps volunteer however, I was looking for opportunities to continue my postgraduate studies. Coupling the MPA’s local effectiveness assessment with my postgraduate studies was viewed by all as an ideal compromise.

My long history with the people and Nguna and Pele was a critical factor in my decision to become a researcher and undertake a PhD centered on the NOAA assessment. It was through repeated local requests for new knowledge on marine-related topics that led me back into academia. Invited to undertake this research by individuals, chiefs, local councils and the Nguna-Pele MPA Network, the research was guided by a locally-expressed need. The critical distinction between being explicitly invited to undertake research (this case) versus approaching a group that presents an interesting case study (most research in Vanuatu) should be emphasized to the reader. The locally-devised nature of the project was also an important factor in garnering support from my academic supervisors.

The communities on Nguna and Pele approached Peace Corps Vanuatu to request that I be re-instated as a volunteer in order to continue the environmental works in progress on the islands
and embark on the proposed collaborative research project. Together, the communities and the Peace Corps negotiated an arrangement whereby I could be reinstated as a volunteer, albeit with a different research-focused assignment. Because the research was to be undertaken by and for local communities and involved a significant capacity building component, Peace Corps was satisfied that it fell under the umbrella of their mandate outlined in the MOU they have with the Government of Vanuatu. Therefore I was to return to Vanuatu as a Peace Corps volunteer tasked with facilitating a locally-driven assessment of marine resource use and management on Nguna and Pele. The Environment Unit agreed to be my government sponsor and was fully engaged in the research process on Nguna and Pele.

4.4 Planning for research, defining protocol

Once the decision had been made collaboratively to transform our relationship from one based on community development to one focused on knowledge generation, there was a need to develop clear ground rules for research. This was accomplished through a series of meetings, both formal and informal, held with communities and NPMPA staff towards the end of my term as a Peace Corps volunteer from May-August 2005. Several guiding objectives were articulated during this preparation and consultation process:

1. Research should answer questions that hold direct relevance to Nguna and Pele residents
2. Research questions should be developed and approved through local consensus
3. Research processes and protocols should include training and capacity building for local residents
4. Data should be collected and analyzed, wherever possible, by Nguna and Pele residents
5. Participation in research by any individual or community should be voluntary
6. A community (chief and council) must officially invite (via written communication) the research term to undertake data collection in their village
7. Results should be returned to the community immediately, and in a form that is locally understandable and accessible
8. Data generated must not be shared with any third party without explicit permission from the community
9. Results must be kept anonymous, with village and individual names suppressed unless specifically agreed
10. Results must not be used to generate income or make a profit for any party
11. Resultant publications and presentations should be co-produced with Nguna and Pele residents, with appropriate acknowledgement of local intellectual property

This set of locally-developed guidelines demonstrates that the level and form of community participation was not decided a priori but emerged from the planning process. With this set of research guidelines, a specific assignment as a Peace Corps volunteer and three years of experiential knowledge about marine use and management on Nguna and Pele, I left Vanuatu in August 2005 to take up temporary residence at James Cook University in order to formalize my candidature as a PhD student.
From August 2005 thru April 2006, I dedicated myself to reviewing the literature on the norms, rules and strategies employed in Melanesia to manage and utilize marine resources. During this time I also formally engaged with the epistemologies, methodologies and approaches of the social sciences. I was required to deconstruct my natural science-based perspective and construct a novel objectivity which included frameworks from anthropology, ethnography, sociology, psychology, linguistics and history.

With three of five JCU supervisors grounded explicitly in the social sciences, I was able to learn techniques for developing indicators and survey questions, running focus groups, analyzing qualitative and quantitative social data, recording informal observations and negotiating the complexities of participatory research designs.

While my time at JCU was extremely productive, detail on the direction research would soon take in Vanuatu could not be specified. Based on the research priorities set out by local communities, research questions and methodologies were to be developed in full collaboration with local residents. Thus, I presented a very broad and generalized research agenda to my supervisors and peers at James Cook University in order to confirm my candidature, and in April 2006 returned to Vanuatu to further solidify the goals and methods of this research.

4.5 The Nguna-Pele MPA Network summit

In June of 2006 the Nguna-Pele MPA Network held a major, week-long summit for all member communities in order to produce a future strategic area plan as well as discuss the specifics of the upcoming research process. Each of the sixteen communities on Nguna and Pele were invited to send 2-5 representatives to the summit held in Unakap Village on Nguna Island. In planning for this dissertation I asked each selected representatives to meet with his/her community in advance of the summit. Specifically each representative was asked to qualitatively and broadly gauge and report on village-specific marine management problems, objectives and expectations.

![Figure 12 Research planning workshops and summit in 2006](image)

The staff of the NPMPA Network, village representatives and I all facilitated various sessions. The first three days were dedicated to general discussion and organizational and technical capacity building. The final two days saw a collective area management strategy emerge along with the set of overarching research questions to which this dissertation attempts to provide partial answers:
1. Are the marine management strategies in use on Nguna and Pele working?
2. What are the specific impacts of each strategy on target resources, the general ecosystem, local incomes, community livelihoods and social capital?
3. How do political, environmental, historical, social and economic factors influence the practical use of research results on Nguna and Pele?

This representative group reconfirmed their agreement with the research guidelines compiled in 2005, and specified further protocols. They determined that research would be best conducted if the research team visited and lived in each village for an extended period, and conducted the research in the local Nakanamanga language. It was agreed that each participating community would host a research team for a minimum of two weeks, during which time all social research for that village would be carried out. Ecological research would be completed opportunistically (based on tides, weather, fuel and distance to the SCUBA refilling station) after social research was completed. They requested that the social research team be made up of one to two local NPMPA staff who would in turn train five to eight volunteers in each village on data collection and analysis protocols. Finally, summit representatives requested that the research protocol be flexible enough to accommodate village-specific goals and objectives. For example, several villages requested that while research was underway, detailed maps be made of their marine and terrestrial closures.

In order to ensure that specific research methods could be appropriately designed, summit representatives nominated a team of core researchers, who would meet regularly over the coming weeks to devise the final methodology. The core research team included myself and four local NPMPA Network staff.

On the final day of the summit, paramount chiefs and village council chairpersons from all area villages were brought to the venue to discuss, adapt and approve the management and research plans devised by their representatives. At this time, several chiefs formally and in writing invited the research team into their communities. In the course of the next few weeks, the NPMPA Network would receive formal letters of invitation to conduct research from a total of six communities on Nguna and Pele.

4.6 Defining specific methodologies and creating indicators

After the summit, the nominated core research team met each day for two weeks to refine the empirical direction the research would take. My local colleague’s superior knowledge of the local context ensured that the research protocol was intimately tied to local conditions and would be achievable in the field. We began by devising one or more indicators which would appropriately measure aspects of local MPAs identified at the summit. To assist in indicator development, we used a set of guidebooks developed specifically for marine management evaluation (Bunce et al. 2000; Hockings & IUCN World Commission on Protected Areas. 2006; Locally-Managed Marine Area Network 2003; Pomeroy et al. 2004; Wongbusarakum & Pomeroy 2008).

14 Core research team members: Charley Manua, Sam Kenneth, Willie Kenneth and Kalpat Tarip.
Some indicators were straightforward and easily measured their intended variable (i.e. total sea area measured with a GPS), but many of the indicators were conceptually vague (i.e. conservation ethic) and required a multifaceted assessment of several quantitative and qualitative variables. Because no single instrument (i.e. household survey) was able to capture the depth of information required, the research team devised an integrated research protocol. In many cases, multiple techniques were used to triangulate results about a single empirical variable. Triangulation has been described as a methodology which allows “the simultaneous display of multiple, refracted realities” (Smith 2005 pp 6), and has been theoretically validated (Flick 2007).

After weeks of discussion and planning, the core research team finalized a draft field methodology to be piloted. Final social science research measurement tools included: individual questionnaires/surveys, key informant interviews, group interviews/discussion, community mapping/transect walks and participant observation. Ecological methods included line-intercept transects, belt-transects, and underwater visual census (UVC).

All research was to be conducted by a village research unit (myself + core research team + village volunteers). Therefore during the first two days of residence in each community, the core research team trained five to eight village volunteers on the theory and practice of conducting social science research. Because each village would be conducting the same methodologies, albeit with a different set of researchers, care was expended to ensure that the research was standardized to the greatest extent possible. For example, the core research team took pains to ensure that village volunteers would deliver individual interviews word for word in exactly the same manner for each interviewee. The core team led extensive training on each methodology regarding appropriate data collection and recording.

4.7 Community-based participatory methodologies

4.7.1 Individual questionnaires/surveys

Central to this study was the use of the individual questionnaire/interview to gauge individual perceptions on the effectiveness of community marine management (Fowler & Cosenza 2009). The final individual questionnaire/interview included 55 questions, both quantitative and open ended, and took approximately 20 minutes to complete. As village populations are typically composed of less than 100 adults, the survey was implemented census-style and aimed to cover at least 85% of the total adult population (Henry 2009). Selective sampling was not undertaken, and the results can be considered as those of the whole population. Only adults over the age of 18 were interviewed for the research. Verbal permission and informed consent was sought prior to the interview (See also Chapter nine).

Qualitative responses from open ended questions were thematically coded through the process of content organization (Cinner & Pollnac 2004). Eight questions in the interview were open ended. Open ended questions often required the interviewee to list responses (i.e. what are the 5 most common…?). Other questions asked for a response to a given scenario (i.e. what would you do if…?).
For quantitative questions, we utilized a modified Likert response scale (Likert 1932). Because we sought a gradient of local perception, an agree/disagree framework was deemed inappropriate (Bachman & O'Malley 1984). The research team also predicted that Likert’s standard 1-5 response categories would be confusing to a largely illiterate population (Lee et al. 2002) and may be a culturally-biased technique (Flaskerud 1988). To deal with these issues, the research team devised a Gradient Response Board tool. With it, interviewees moved a bead along a fishing string superimposed over a rainbow spectrum to indicate the strength and direction of their perception.

![Diagram of Gradient Response Board tool]

**Figure 13** A tool developed to gauge Likert-style quantitative responses to individual questionnaires/surveys.

This technique is novel, although it is related in premise to a Cantril’s self-anchoring ladder (1966) and McClanahan’s string-based technique (McClanahan et al. 2005b). Questions using this tool were posed with two opposing statements as scale anchors and reference points for the interviewees (Reynolds & Jolly 1980). The question and anchor words were repeated exactly in the same way in each interview. Before the question was asked, the bead was moved off the
scale. The place of the bead on the board was converted by the interviewer into a 10 point a Likert-style category. A total of 47 questions yielded quantitative data from the gradient response board tool.

Perceived changes were also measurable using the gradient response board. Respondents were asked the current status of a certain variable on one bead slider, and the status of the variable 10 years in the past on the second bead slider. A trend in the perceived variable could be calculated using the equation: \( T \) (trend) = \( V_p \) (past variable) – \( V_c \) (current variable).

4.7.2 Key informant interviews

The research team conducted key informant interviews in each community to obtain general community-level information (Fetterman 2009). In general, they were asked to comment widely and informally on six topics:

- **local village governance**: hierarchy, structure and processes
- **marine resource management**: written/non-written regulations, rules, norms and strategies
- **community socio-economic status**: total population, economic activity, infrastructure, gear ownership, etc.
- **critical community/social issues**: affecting men, women and youth
- **environmental issues**: affecting men, women and youth
- **current disputes**: over land/sea resources, boundaries, crimes or governance

Key informants were selected based on their knowledge of the area and their willingness to share information (Marshall 1996). Each informant recommended several other potential key informants in a snowball-esque sampling technique (Goodman 1961). Key informant interviewing continued until the information obtained became redundant. Known as saturation sampling, this technique is widely used in social capital research (Lin 2001). In each community, between 3 and 6 key informants were interviewed, once verbal permission had been obtained. The interviews did not last for more than sixty minutes. Responses were recorded, transcribed and later thematically coded for analysis. These interviews provided useful quotes to illustrate, explain, and clarify quantitative results. As Arratia asserts (1997), we also found that more than any other medium of knowledge, people’s stories have the potential give a sense of “texture, meaning and reality.” Local stories and anecdotes would play a major role in interpreting motivations for establishing MPAs.
4.7.3 Focus groups

We used gender-segregated focus groups to tease out the major themes that emerged during key informant and individual interviews. Focus groups have been called a targeted tool used to identify “the salient dimensions of complex social stimuli as a precursor to further quantitative tests” (Kamberelis & Dimitriadis 2005 pp 899). For example, nearly all of interviewees told us that their primary expectation of village marine closures is to augment the number of valuable fish. But what are these valuable fish? In focus groups, we were able to collectively rank the fish men and women collected and thereby build our ecological effectiveness surveys.

Focus groups were co-facilitated by a member of the core research team and myself. They included between 8-14 participants (Morgan 1997). Discussion was moderated to enable equitable contributions from all participants (Kitzinger 1994). In each community, focus groups informally discussed 8 principal themes:

- Resources
- Threats
- Lifestyle
- Marine rules, norms and strategies
- Customary marine tenure
- Conservation and management ethic
- Disputes
- Supra-village marine governance and the NPMPA Network
4.7.4 Community mapping

The village research unit in each community mapped the full boundaries of community marine and terrestrial areas, as well as marine reserves and taboos using a Garmin global positioning system (GPS). Geospatial data was analyzed using ArcView GIS version 3.3.

During mapping exercises, the local research team was able to enter into practical dialogue with community members about their natural environment in the field. It was assumed that by conversing while walking through the physical environment, specific ideologies and mental models would more easily be assessed (Borrini-Feyerabend et al. 2000). The community mapping exercise allowed for verification and corroboration of issues and statements made during the individual, key informant and group interview sessions.

4.7.5 Direct participant observation

Malinowski (1922) asserted that researchers are able to approximate “native’s point of view” by living and interacting with them. Owing its origins to him and others like Boas, Stevenson and Cushing, participatory research assumes that cultural understanding is acquired through intimate participation with the culture being studied (Tedlock 1991). Although now situated within a radically different worldview to that held by these early ethnographers, contemporary participant observation approaches are often characterized by the willingness of the researcher to develop “membership identities in the communities they study” (Angrosino 2005). Active participation in community life decreases the chances that research will record contrived information, as depicted in the Far Side cartoon below.
Today observer-as-participant methods in research have been much refined and theoretically strengthened. Widely-used, participant observation methodologies are based in the tradition of grounded theory, enabling knowledge to be gained without experimentation (Haglund & Olsson 2008). Natural, everyday interaction releases the researcher and subject from the constraints of formal interview settings (Kearns 2005). Observation may range from passive to active integration (Baker 2006), while the more assiduous approaches have been dubbed “intensive dwelling” (Clifford 1997), “deep hanging out”, “deep chilling” and “deep grooving” (Wittbecker 1986).

Together we (myself + core research team + village volunteers) assumed the role of participant observers. Strong pre-established relationships with individuals and communities ensured that our participant observer status was much farther towards the “intensive dwelling” side of the participant observation spectrum. The entire research team was composed of Nguna and Pele locals, born in the very villages where the research was conducted (I, of course being the only exception). It is clear therefore that our research was far from the ‘outsider looking in’ paradigm of much early anthropological research. The team’s intimate, deep, and life-long knowledge of the social-ecological system eliminated the very real risk faced by foreign researchers that that they will be told what locals think they want to hear (Edmonds 1995). As participant observers in the study communities, we attended village meetings, ceremonial events, fishing excursions and garden trips, all the while critically reflecting on what we saw and heard. At the end of each day, the village research unit would meet to enter data into the computer, transcribe interviews, download maps, interpret what had been observed and discuss how it related to our research questions.

4.7.6 Ecological surveys

Detailed ecological methodologies are presented in Chapter eight. For all underwater research, local collaborators were fully included in the design, data collection and interpretation of
results. At the summit, local representatives identified key marine species that are protected and locally utilized. In village focus groups, key informant and individual interviews lists of critical marine species and knowledge were also compiled. Underwater research was therefore designed to measure parameters about these key organisms, as well as those identified as ecological indicator species in the literature. Accordingly ecological surveys were conducted after community social surveys had been completed.

A core team of researchers was selected for underwater surveys, in which each member is SCUBA certified\textsuperscript{15}. A two-week training session was conducted for the three ni-Vanuatu divers and overseas volunteer. In the training, surveyors learned how to conduct standard ecological surveys, utilize scientific taxonomic classification systems, record data underwater, test for visual measurement accuracy, and practice safe scientific diving. Several aspects of the surveys were adapted to suit local conditions, for example using leaded ropes as transect markers in lieu of lightweight fiberglass tape measures. Multiple pilot surveys were run, validated and re-run with the trainee team. Divers were selected for their tasks during the actual survey based on their performance during training. For actual data collection, one person surveyed fish, one surveyed invertebrates, one surveyed substratum and one acted as a safety buddy and logistical diver.

![Figure 18 Team of Nguna-Pele divers on a reef survey](image)

Ecological research was conducted during the summer months when wind and waves were at a minimum. The research team set out each morning from the NPMPA Network base on Pele island with a set of SCUBA tanks to spend the day on the water. The first group to descend would be the fish surveyor and dive buddy. Once the 100m transect had been surveyed for fish, the invertebrate and substratum divers would simultaneously work along the transect while the first group would circle back behind and pick up the transect line. Deep transects were surveyed first in each site. Each person dove three times per day, usually only to a maximum depth of 8m. In this way, it was possible to complete three full sites (1 site=2 x 50m at 7m and 2 x 50m at crest) per day.

4.8 Data analysis, interpretation and dissemination of results

At the end of each day the village research unit would meet to discuss the day’s events and jointly interpret them in the context of the research. I took detailed notes of the collaborative

\textsuperscript{15} Charley Manua, Willie Kenneth, Sam Kenneth, Jessica Nilsson, Christopher Bartlett.
reflections. Particularly important in these sessions was the chance to triangulate results from the different methodologies employed during the day (Campbell 1959). Data sheets from interviews and focus groups were collected from surveyors and volunteers and entered into the computer by the core team. Key informant interviews were transcribed and thematically coded on the day they were conducted. For ecological surveys, each surveyor would enter his/her own data to be double checked by the dive buddy. Often the team would work late into the night to be ready for the next day.

Before leaving the community, the core research team produced a summary of descriptive results. Requiring sufficient word processing and data analytical skills to comply with this protocol, I spent time in developing this capacity among the NPMPA staff and local village volunteers. Several copies of the raw data, analyzed results, boundary and tenure are maps, photographs, meeting minutes and additional documents were both printed and put on CD-ROM and handed over to the village chief, council and conservation committee.

Back at James Cook University in April 2007, I further compiled and began exploring the data. At that time I also began evaluating novel tools for analysis, and began writing up results for peer reviewed publication. Communication and collaboration with my ni-Vanuatu colleagues did not cease when I left Vanuatu’s. I remained in weekly and often daily contact with the core research team, principally to discuss progress on the analysis and raise concerns and questions over counterintuitive patterns in the data. Accordingly each of the papers currently published include ni-Vanuatu colleagues as co-authors. Credit is given where credit is due, and acknowledgement always is given to the entire population of Nguna and Pele.

This dissertation is not intended for the Nguna and Pele audience. Using scientific terminology and ‘expensive’ English, it does not meet the criteria set by local communities that research be returned in a form locally understandable and accessible. For this reason, I, and several members of the original research team have drafted a book-length version of the research results. Written in the Bislama and Nakanamanga it will present findings of this research in the most useful and relevant way to Nguna and Pele’s communities. Copies of this dissertation (and all other resultant publications) have been provided to the communities concerned as well as to the relevant national departments, cultural organizations and NGOs.

Ultimately it is my hope that other communities, researchers, academic institutions and governments will see the value in collaborative and participatory production of knowledge. By this approach science can move forward as an institution for human advancement that is equitable, respectful and cognizant of our inherent diversity.
So that the reader may more fully understand the contemporary context of marine protected areas in Vanuatu, this chapter reviews the patterns of marine resource exploitation on Nguna and Pele Islands since the time of human colonization. Reconstructing historical marine exploitation in Vanuatu is a difficult task because unlike in many parts of the developed world, in Vanuatu the written historical record only began when European explorers passed through the islands in the 17th century. Even since that time, written observations are spotty and inconsistent. Bedford and Spriggs (2008) lament that Vanuatu’s written records are "varied in terms of their focus, coverage and detail. Prior to the 1840’s they are few and far between”.

This dearth of accurate historical records has allowed a degree of creative freedom to the commentators on marine use in Vanuatu. Much of the current discussion on ancient life in the islands is considered by some to be nothing more than “conjectural history without academic merit” (Kirch 1996 pp 57). In order to escape these critiques, this chapter sets out to comprehensively review evidence for historical Vanuatu marine exploitation from the fields of archaeology, oral history, anthropology, and ecology. According to Munro (1995), “Theory is no real substitute for leg-work in the archives and in the field. There is a difference between being informed by theory and allowing theory to drive the argument.”

5.1 Marine exploitation over the last 3,000 years

5.1.1 Earliest ni-Vanuatu inhabitants

“Towards the end of the second half of the second millennium BC, a pottery-making and Austronesian-speaking people, thought to be biologically of Island Southeast Asian origin, appeared in the Bismark Archipelago immediately to the East of the island of New Guinea. The Lapita expansion was rapid and involved the settlement of Remote Oceania including Vanuatu, New Caledonia, Fiji and on to Tonga and Samoa in western Polynesia within two to three hundred years.” (Buckley et al. 2008)

Originating from Taiwan, the Lapita group of Austronesian peoples led the colonization of the entire Indian-Pacific Ocean regions extending from Madagascar in the West to Polynesia and Micronesia in the East (though see Cox (2008 pp 51) and Donohue & Denham (2008) for contrasting settlement models). The first island in Vanuatu to be colonized is still a matter of debate (Buckley et al. 2008; Cox 2008) though most agree that particular islands may have acted as colonization focal points or metropolis’ (Bedford et al. 1999). Efate Island was likely one of these Lapita focal areas (Bedford 2006). There is also evidence that post-settlement, Vanuatu became an important launch point for the human colonization of the rest of Remote Oceania (Bedford & Spriggs 2008).
Research into recently discovered Lapita burial sites in Vanuatu puts human colonization on Efate island at 3200-3000 years BP (Bedford & Spriggs 2000; Bedford et al. 2006). Estimates put the potential prehistoric population of Vanuatu at 1.5 million (Spriggs 1997), nearly 8 times that of the most recent census (Bakeo et al. 2000). The structure and location of ancient settlements suggest that the earliest Lapita inhabitants lived within structured social groupings (Green 2003; Kirch & Green 2001). These were larger than, but with distinct similarities, to contemporary communities and villages. The location of existing Lapita finds in Vanuatu, suggest that original settlers would look for homesites with an abundance of marine resources. Bedford writes (2006 pp 262) that in Vanuatu

"the zones targeted for settlement were overwhelmingly coastal, with a preference for areas which included easy canoe access, fringing reefs and/or lagoonal environments and easily accessible freshwater source… these factors enabled maximum utilization of marine and other faunal resources… occupation may have been short-lived due to changing environmental factors"

Analysis of Lapita human remains in Vanuatu have found that the earliest human residents in Vanuatu were

“well adapted to the island environment, but lived a physically active life while coping with a significant disease burden” (Buckley et al. 2008 pp 110).

Very little archaeological work has been undertaken on the islands of Nguna and Pele. However a dig on Nguna in 2003 revealed human discards and pottery of the Erueti period originating from at least 2700-2500 years BP (Bedford 2004). The Nguna Dalparu settlement was located within 100 meters of the coast, adjacent to a small fringing reef.
5.1.2 Lapita marine resource use

The first archaeological record of Lapita people's use of marine resources in the published literature is Gifford’s analysis of mollusk remains from sites in New Caledonia (1956). Since that time, nearly all Lapita archaeological finds in the Pacific have included at least some marine resource remains. Vanuatu’s Lapita inhabitants appeared to have attached some cultural significance to nearshore marine resources (Spriggs 1997), commonly using bivalve and turtle shells as decoration and as part of burial rites (Bedford et al. 2006). Further, results from isotopic analysis on Vanuatu Lapita tooth enamel and wear suggest an early diet which included marine organisms (Bentley et al. 2007; Buckley et al. 2008). Tooth condition of the earliest known Lapita settlement site (Teouma) suggests a mixed diet of “soft carbohydrate foods” and “rougher foods (e.g. shellfish)” (Buckley et al. 2008 pp 108). A mixed marine diet matches other studies conducted on Fijian Lapita remains (Nunn et al. 2007 pp 125), although some Fijian sites yield only the remains of marine resources (Thomas et al. 2004).

Based on these findings it is likely that marine resources were used by ni-Vanuatu people from the time of first settlement throughout the history of human habitation. In an archaeological analysis of fish and shellfish remains at the Mangaasi site on Efate island, Bedford (2006) found that sea resources were utilized throughout the first 1500 years of settlement. Remains most represented shellfish harvested from the sandy intertidal zones. Shellfish in this zone are typically easily harvested, not requiring a great deal of skill (Schmidt 2000). In most Vanuatu Lapita sites, there existed a fairly “unsystematic collection of shells from nearby sand areas” (Green & Anson 2000; Sand et al. 2002 pp 143). This evidence suggests that early inhabitants may have been unspecialized intertidal foragers (Bedford 2006).

![Figure 20 Drawing representing the oft-presented paradigm of prehistoric coastal resource use in Vanuatu (Lucas Kukler; permission from the Vanuatu Cultural Center)](image)

Bedford suggests that fish were also a “consistent component of the Lapita diet” (Bedford 2006 p 232). As can be seen from the summary table of the fish remains found at Lapita sites in Vanuatu (Bedford 2006 p 236), almost all targeted fish are reef-based species. Oceanic marine species are much less frequently found in Lapita archaeological deposits, probably due to limited technological capacity (Fraser 2001).
Table 2 Archaeological findings of fish families from a 3000 year old settlement on Efate island. Adapted from (Bedford 2006 pp 236)

<table>
<thead>
<tr>
<th>Family</th>
<th>Common Name</th>
<th>% remains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaridae</td>
<td>Parrotfish</td>
<td>30.4</td>
</tr>
<tr>
<td>Diodontidae</td>
<td>Porcupine fish</td>
<td>17.3</td>
</tr>
<tr>
<td>Epinephelidae</td>
<td>Grouper</td>
<td>10.1</td>
</tr>
<tr>
<td>Coridea</td>
<td>Wrasse</td>
<td>9.8</td>
</tr>
<tr>
<td>Acanthuridae</td>
<td>Surgeon fish</td>
<td>6.5</td>
</tr>
<tr>
<td>Balistidae</td>
<td>Trigger fish</td>
<td>4.1</td>
</tr>
<tr>
<td>Holocentridae</td>
<td>Squirrel fish</td>
<td>4.1</td>
</tr>
<tr>
<td>Elasmobranchii</td>
<td>Shark/ray</td>
<td>3.8</td>
</tr>
<tr>
<td>Lethrinidae</td>
<td>Emperor</td>
<td>3.3</td>
</tr>
<tr>
<td>Teleostomi</td>
<td>other</td>
<td>2.3</td>
</tr>
<tr>
<td>Nemipteridae</td>
<td>Bream</td>
<td>1.4</td>
</tr>
<tr>
<td>Carangidae</td>
<td>Jack</td>
<td>1.4</td>
</tr>
<tr>
<td>Mullidae</td>
<td>Goatfish</td>
<td>1.1</td>
</tr>
<tr>
<td>Lutjanidae</td>
<td>Snapper</td>
<td>0.9</td>
</tr>
<tr>
<td>Muraenidae</td>
<td>Moray eels</td>
<td>0.9</td>
</tr>
<tr>
<td>Ostraciidae</td>
<td>Boxfish</td>
<td>0.9</td>
</tr>
<tr>
<td>Belonidae</td>
<td>Needlefish</td>
<td>0.6</td>
</tr>
<tr>
<td>Scorpaenidae</td>
<td>Scorpion fish</td>
<td>0.6</td>
</tr>
<tr>
<td>Myliobatiformes</td>
<td>Rays</td>
<td>0.3</td>
</tr>
</tbody>
</table>

In some Pacific Lapita archaeological sites, the recovery of relatively advanced fishhook technology is quite common (O’Connor & Veth 2005). Kirch believes that the Pacific Lapita used several marine resource harvest techniques including angling (hooks), netting, spearing, and plant poisons (1997 pp 201). This is not the case for Vanuatu however. After eight years of digs throughout the Vanuatu archipelago, Bedford (2006 pp 213) found a “complete absence” of fishhooks16. Kirch notes that sea resources were just one source of sustenance for early island settlers, explaining that

"as important as the sea was to Lapita life, it by no means provided their sole basis for existence." (1997 pp 203)

He lists 28 Lapita food plants thought to make up the basis of the Pacific prehistoric economy (pp 206-207). Bedford also confirms that horticultural produce would have been the “major supplier of sustenance” in Vanuatu (Bedford 2006 pp 262). After examining the remains from dozens of sites across the Pacific, Butler also argues that

“a careful reading of the archaeological evidence of Lapita fish remains would indicate that fish were not a significant component of subsistence at all” (Butler 1988 pp 115).

In essence, the Lapita cultural complex in Vanuatu was decidedly agrarian but used sea resources opportunistically (Spriggs 1997pp 84). The development of intensive agriculture however, may have been a belated development in Vanuatu. Permanent settlements and strong dependence on agricultural systems, likely did not occur until the post-Lapita period or ~1000 years BP (Bedford 2006 pp 263). Archeological evidence from the post-Lapita period suggest

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16 Many of the fish species remains found in Vanuatu digs would have best been captured with baited hooks.
large settlements, rapid population growth, the presence of domestic animals, the abandonment of previous settlements and refined terrace cropping (Harris 1996 pp 530).

5.1.3 Early (mis?) management

Throughout much of the world, there exists a widely held perception that prehistoric peoples lived in harmony with their natural environment. Even today, the concept of an ‘ecologically noble savage’ (Redford 1991) holds considerable traction among indigenous and conservation activists. It is not uncommon to read and hear assertions like

“Most island people of the Pacific have been successfully managing the limited fragile resources of small tropical islands for thousands of years. Their conservation methods have proven themselves through the test of time” (Hickey 2001 pp136)

But does the empirical evidence corroborate these claims? Most Pacific prehistoric archaeologists have reached consensus that early Pacific inhabitants had considerable impact on the environment (Anderson 2002; Kenneth et al. 2006; Kirch & Rallu 2007). Spriggs (1997) hypothesizes that many Lapita settlements in Vanuatu were completely abandoned due to human overuse and degradation. Steadman (1989) notes the sudden absence of endemic bird and reptile remains evidence soon after the period of initial human settlement in the Pacific Islands, and cites hunting, competition with domesticated animals, and habitat degradation as direct causes. In reference to Vanuatu, Bedford (2006 pp262) writes that:

“Extinct birds were identified in only the lowest layers of a number of sites on all islands. The remains of an extinct land crocodile have also been identified at the Arapus site…There are even indications that certain species may have been extirpated from particular areas on different islands.”

To explain the species extinctions, Bedford argues that early Lapita resource use in Vanuatu likely followed a Blitzkrieg-like scenario (2006 pp261-262). That is, resources were harvested to maximum capacity, and once depleted, settlers moved on to more pristine locations. The Blitzkrieg scenario closely matches "prey choice frameworks" from foraging theory, which suggest that harvesters initially focused on the most valuable resources and then shifted to less valuable ones as target populations declined (Butler 2001). The prey choice foraging model may explain why Lapita peoples chose settlement sites close to wide fringing reefs (Nunn et al. 2007), so as to have access to a large pool of easily harvested resources. As optimal scavengers, it is likely that early settlers preferred to harvest in shallow, sandy, easy to reach marine environments (Bedford 2006 pp 243).

Prehistoric anthropogenic depletion of nearshore marine resources is well documented in archeological record of the Pacific Islands (Amesbury 2007; Fitzpatrick & Donaldson 2007). Localized overuse and depression of marine resources has even been implicated as a potential driver of Pacific prehistoric human dispersal (Mannino & Thomas 2002). According to foraging theorists, resource depression by Lapita peoples has been demonstrable in several ways (Morrison & Addison 2008): 1) decreasing amount of large bodied prey relative to smaller prey; 2) increasing use of less profitable habitats; 3) use of increasing taxonomic diversity; 4)
decreasing average age and size of exploited taxa\textsuperscript{17}. The following Table 3 lists some of the key evidence for human impact on nearshore marine resources in Vanuatu and the wider Pacific.

Table 3 Summary of results of analysis of fish bone and mollusc shell assemblages in Pacific Island archaeological sites reproduced/appended from (Dalzell & Adams 1997)

<table>
<thead>
<tr>
<th>Location</th>
<th>Time period</th>
<th>Comments</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongatapu (Tonga)</td>
<td>3,500-2,000 BP</td>
<td>Initial heavy of exploitation of bivalve molluscs (<em>Anadara</em> spp &amp; <em>Gafrarium</em> spp) by early colonisers, followed by decline in <em>Anadara</em> spp due to a combination of fishing pressure and environmental effects. Mortality curves for <em>Gafrarium</em> reflect increasing fishing pressure on population with decrease in average size (and age) in population.</td>
<td>Spennenman (1987)</td>
</tr>
<tr>
<td>Mangaia (Cook Islands)</td>
<td>980-330 BP</td>
<td>Significant increase in frequency of molluscan remains at about 500 yrs BP. Average size of gastropod <em>Turbo setosus</em> decreased by 50 per cent between the earliest layers in the sequence and those in later years.</td>
<td>Kirch et al 1995</td>
</tr>
<tr>
<td>Tikopia (Solomon Islands)</td>
<td>2,900 -200 BP</td>
<td>Ark shells and other gastropods major source of animal protein during initial period of colonisation. Mollusc populations reduced through fishing and environmental change, followed by diversification of food base through agriculture.</td>
<td>Kirch &amp; Yen (1982)</td>
</tr>
<tr>
<td>Pari (south east Papua New Guinea)</td>
<td>2,000 BP-Present</td>
<td>Gastropod and bivalve molluses in shell middens reflect exploitation pressure with shift through time, with decrease in average size (and age) in population.</td>
<td>Swadling (1977)</td>
</tr>
<tr>
<td>Santa Cruz Islands (Solomon Islands)</td>
<td>3,200-2,600BP</td>
<td>Gastropod and bivalve molluses in shell middens reflect exploitation pressure with shift through time, with decrease in average size (and age) in population.</td>
<td>Swadling (1986)</td>
</tr>
</tbody>
</table>

\textsuperscript{17} Fish abundance estimates are potentially confounded by mesh screen recovery techniques. Some fish families possess bones which are more robust over time, and therefore more easily recoverable than others (Nagaoka, 2005).
<table>
<thead>
<tr>
<th>Location</th>
<th>Time Period</th>
<th>Findings</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Niutoputapu (Tonga)</td>
<td>2,800-200 BP</td>
<td>Fish bone assemblages from excavations show long term exploitation of reef &amp; lagoon species, similar to contemporary fishing patterns.</td>
<td>Kirch &amp; Dye (1979), Kirch (1988)</td>
</tr>
<tr>
<td>Kapingamarangi &amp; Nukuoro, (Caroline Islands)</td>
<td>1,050-500 BP</td>
<td>Fish bone assemblages reflect importance of reef and lagoon fish as staple animal protein, despite cultural importance of pelagic fish such as rainbow runner (<em>Elegatis bipinnulatis</em>)</td>
<td>Leach &amp; Davidson (1988)</td>
</tr>
<tr>
<td>Aitutaki (Cook Islands)</td>
<td>2,000-1,000 BP</td>
<td>Change in shell hook manufacture from pearl oyster shell (<em>Pinctada margaritifera</em>) to turban shell (<em>Turbo setosus</em>) with time due to breakdown in inter-island communication and trade. Reliance on more fragile <em>Turbo</em> hooks reflected in greater exploitation of smaller lagoon fishes</td>
<td>Allen (1992)</td>
</tr>
<tr>
<td>Palau</td>
<td>1,300-100 BP</td>
<td>Fish bone assemblages suggest continuity in reef fish composition and fishing practices during pre-contact period</td>
<td>Masse (1986)</td>
</tr>
<tr>
<td>Mussau (Papua New Guinea)</td>
<td>3,500-350 BP</td>
<td>Comparison of fish bone assemblages suggests greater reliance on line fishing for reef carnivores in west Pacific compared to net and spear fishing for reef herbivores/omnivores in east. Differences may possibly reflect greater fishing pressure in east with reduction of reef carnivore populations</td>
<td>Butler (1994)</td>
</tr>
<tr>
<td>Vanuatu (Mangaasi, Efate)</td>
<td>2,900-400 BP</td>
<td>Average size of gastropod <em>Trochus niloticus</em> decreased by 50 per cent between the earliest layers at Arapus and subsequent layers found at Mangaasi.</td>
<td>Schmidt (2000), Bedford (2006)</td>
</tr>
<tr>
<td>Moturiki Island (Fiji)</td>
<td>2720-2350 BP</td>
<td>Average size of <em>Trochus</em> declines by 20mm. Decline in total shell weight in pits over time.</td>
<td>Nunn (2007)</td>
</tr>
<tr>
<td>Mangai (Cook Islands)</td>
<td>700BP</td>
<td>Average size and abundance of Serranidae decrease with human pressure.</td>
<td>Butler (2001)</td>
</tr>
<tr>
<td>Vanuabalavu (Fiji)</td>
<td>1100 BP</td>
<td>Decrease in average size of bivalve <em>Anadara</em> sp.</td>
<td>Thomas et al (2004)</td>
</tr>
<tr>
<td>Northern Rock</td>
<td>1700 BP</td>
<td>Significant declines in abundance of</td>
<td>Fitzpatrick</td>
</tr>
</tbody>
</table>
islands (Palau) sea bream, Parrotfish, wrasse, and leatherjackets. Decreasing species richness through time.

In Vanuatu, both fish and shellfish were subject to Lapita and post-Lapita human pressures. The archaeological record gives evidence of declines in resource abundance and size (Butler 2001). On Efate Island, the basal widths of trochoi remains (*Trochus niloticus*) found in pits in Arapus (earlier settlement) were compared to those in Mangaasi (later settlement) (Bedford 2006). Shells found in Arapus were 50% larger than those found at Mangaasi (Schmidt 2000). Reduced size is a commonly-cited outcome of high invertebrate fishing pressure (Ashworth et al. 2004). A similar consequence of early human exploitation on trochus size was found in the Reef/Santa Cruz group of the Solomon islands (Swadling 1986).

Figure 21 Child on Nguna holds a trochoi shell, trochoi shells awaiting sale to urban-based button makers.

There are alternative hypotheses about why resources consistently declined in size and abundance after Lapita settlement in the Pacific. These generally disagree that humans could have directly caused environmental degradation to the degree evidenced in the archaeological record (Brookfield & Overton 1988; Grant 1994; Nunn & Britton 2001). Geoarchaeological evidence points to a major climactic event in the Pacific region approximately 700 years BP (Allen 2006; Nunn 2000). Contemporary evidence clearly demonstrates the potential scale and breadth of climactic impacts on marine resources, including declines in abundance, biomass, and diversity (Walther et al. 2002).

Climactic factors alone however, cannot adequately explain the patterns of marine resource decline found in the Pacific Island archaeological record (Butler 2001). More likely is that climate and human harvest pressures working together may have facilitated the marine resource declines in early Lapita sites (Morrison & Addison 2008). Ultimately however, we know that the Lapita cultural complex died out in Vanuatu, and according to Spriggs, principally due to environmental degradation (1997). Even if ni-Vanuatu did not directly overharvest natural resources, Spriggs (1997) argues that the Lapita peoples aided environmental instability through the advent of large-scale and unsustainable agricultural practices.

This review of the literature gives several clues about prehistoric Lapita marine resource use, management and subsistence lifestyle. Primarily, there is strong consensus that early ni-Vanuatu settlers utilized reef-based marine resources for subsistence, though may have focused
more heavily on terrestrial activities. Another critical point made by multiple authors is that early Lapita people had a severe deleterious impact on reef resources, most likely caused by excessive targeted harvest. The evidence clearly demonstrates that at no point since human colonization of Vanuatu have marine resources increased in average size or become more abundant. In fact, these reverse is true. This fact suggests that either 1) marine management is only a very recent phenomenon, or 2) prehistoric management existed but was ineffective.

5.2 Marine exploitation over the last 300 years

5.2.1 Custom stories

As discussed, culture and customary practices are not readily preserved in the archaeological record. There is a distinct gap in availability of physical evidence on prehistoric marine use. Much must therefore be pieced together circumstantially. In other long enduring cultures where the written or physical record is lacking, relatively accurate histories may be constructed from oral histories and stories (Bailey & Israel Oriental 1980; Vansina 2006). Vanuatu has a strongly developed tradition of oral history (Bonnemaision 1996), with custom stories describing many aspects of ni-Vanuatu life. It may therefore be possible to uncover important aspects of pre-contact marine use and management on Nguna and Pele through a detailed examination of oral history.

Recent evidence suggests that oral histories in Vanuatu however can be remarkably accurate. A huge volcanic eruption occurring several hundred years ago forms the centerpiece of many widely-told legends in Vanuatu. These stories are corroborated by geological evidence suggesting that the Kuwae volcano erupted in AD 1452 (Witter & Self 2007). In another example Nunn et al. (2006) recorded oral histories about existence and disappearance of several islands in Vanuatu. Subsequent geological analysis revealed that the custom stories were remarkably accurate in terms of volcanic and tectonic activity.

While there are limitations to using oral histories to reconstructing accurate historical timelines and practices (Nunn et al. 2006 pp48; Tonkin 1992), custom stories may be used to triangulate other evidence regarding the past use and management of marine resources on Nguna and Pele.

5.2.2 Local stories from on Nguna and Pele about marine use

The first records of oral history from Nguna and Pele began in 1870 with the arrival of the Reverend Peter Milne. He was succeeded by his son William Veitch Milne until 1937. Subsequent missionaries to Nguna, Ken and Chris Crump (1938-1956), also recorded some local stories. Later in 1963, a team of French anthropologists including J.J. Espirat and J. Guiart visited the central islands of the then New Hebrides to detail the system of hereditary titles and record associated stories. Soon afterwards a University of Hawaii researcher, Albert Schutz, spent several months on Nguna in 1966 to record texts and stories. Canadian researcher, Ellen Facey lived on Nguna island intermittently between 1978 to 1980 to serve as what she has called a "scribe of kastom", eventually producing a volume entitled Nguna Voices (1989).

Of all that has been recorded from Nguna and Pele, only a handful of the stories make mention of marine resources or habitats. A few of the older stories mention the use of shellfish (Schütz
1969b pp 12) and fish (Facey 1989 pp 132; Schütz 1969b pp 283). Some stories describe resource biology (Facey 1989 pp 260-263) or the origins of marine spirits. In precontact times, spirits were believed to have resided in every village on Nguna, often living in caves (Schütz 1969b pp 102) and taking the form of marine animals including, snakes, crabs, sharks or even whales (Facey 1981 pp 305). For example, the principal spirit of Piliura village on Pele was a gigantic shark called Peseruru, who was widely believed to have the power to protect the village from its enemies (by tipping over canoes) as well as the ability to transport the Chief across the water on its back (Espirat et al. 1973 pp 335).

5.2.3 Early written records on marine use and exploitation in Vanuatu.

The preceding sections demonstrate, with evidence from archaeology and oral history, that ancient marine management may not have been a reality on Nguna and Pele. Additionally, there evidence to suggest that today’s taboo institutions were not originally intended as conservation strategies or to ensure the long-term maintenance of important stocks. However, another source of information may yet help to explain the contemporary preoccupation with marine reserves and taboos on Nguna and Pele; the eye witness observations of early European visitors to Vanuatu. The earliest and most comprehensive written sources of information about marine use in early Vanuatu come from the journals, diaries and shipboard logs of explorers, traders and missionaries. What follows is a brief synopsis of how ni-Vanuatu people have been observed to utilize marine resources over last four hundred years.

By most accounts, the first European to reach what is now the Republic of Vanuatu was the Portuguese navigator Pedro Fernandez de Quiros sailing under the Spanish flag in 1606. He and his crew made the first written observations of pre-contact Vanuatu, including some notes on marine resource usage by locals. Stopping in Big Bay on Santo Island, Quiros noted that

“They make much use of mother of pearl shells, which they turn into wood chisels, fish hooks, and many types of neckwear” (Kelly 1966)

During a raid on huts abandoned by terrified locals, his crew found

“Several kinds of fish, roasted and wrapped in plantain leaves, and a quantity of raw mussel-shells” (Quiros 1904a pp 257-258).

He also noted that island residents

“Use shells also for musical instruments” (Quiros 1904a pp 265).

Of fishing practices, Quiros observed that residents

“Fish with a three-pronged dart, with thread of a fibrous plant, with nets in a bow shape, and at night with a light” (Quiros 1904a pp 267).
Quiros’ journals provide clear evidence that marine resources were exploited by ni-Vanuatu at the time of first European contact. Additionally, his observations reveal that exploitation strategies had evolved significantly since the optimal foraging period of the first Lapita peoples, 3500 years before. Most importantly, we see that marine resources during this period were used for food, but also formed a part of musical culture.

Though preceded to the islands of Vanuatu by Quiros in 1606 and Bougainville in 1768, Captain James Cook was the first European to sight central and southern Vanuatu in 1774, giving the archipelago its former name: The New Hebrides. Captain Cook passed Nguna, Emao and Efate Islands on Tuesday, 26th of July 1774. He called them “Hinchinbrook” (Emao), “Montague” (Nguna) and “Sandwich” (Efate) Islands. This designation was widely used until the early 20th century in other early writing on the area (Goodenough 1876 pp 288; Ray 1887 pp 409; Schütz 1969a app 6). One gains an environmental appreciation of the Nguna-Pele area two hundred years ago from the following passages describing Cook’s impressions:

“At noon we were in the Channel which divides the easternmost from the large island (Emao from Efate)... The sides of this isle opposed to us (Nguna) exhibited a most delightful view, its shores are low, the land rises with a gentle ascent to the hills, which are of moderate height, it is everywhere spotted with woods and lawns and has the appearance of great fertility but there is no approaching the coast in this part, on account of rocks and breakers, but on the west side of the small isles there seemed to run a bay (Undine), which if examined may be found to afford good anchorage... It ought to be remarked that we have not yet seen an isle on which we have not either seen people or signs of people (pp 473)...In short so far as may be judged from what we have seen from the ship this is one of the most beautiful and desirable islands we have yet seen in the South Seas (Cook et al. 1955pp 510).”
While Captain Cook did not weigh anchor on Nguna or Pele, his observations from other islands illuminate the then ni-Vanuatu agricultural way of life.

“When night fell the country was alight with fires from the shore to the hill tops as the people burnt off the growth for their plantations” (pp 409).

“In Sandwich Bay, Malekula however, he witnessed people collecting shellfish on the reef at low tide (Cook et al. 1955). One is able to deduce that ni-Vanuatu placed some non-subsistence value on marine resources from his description of ni-Vanuatu’s appearance:

“The men were naked, with a belt round the middle so tight is almost gave them two bellies, attached to this a penis case made of cloth or a leaf, they wore bracelets of shell-studded cord and hogs tusks, curved cylindrical pieces of shell stuck through the nose, ear-rings of tortoise shell.” (Cook et al. 1955 pp 397).

After Captain Cook’s passage near Nguna and Pele in 1774, very little else was recorded on the area until the mid 19th century. Sandalwood was discovered in the New Hebrides in 1828, and due to a fear that trade secrets be used by the competition, there was a “habit of secrecy with respect to all their transactions on the part of the traders” (Erskine 1853 pp 15). These traders therefore leave very few records of value to ethnographers. By 1849 Sandalwood was already scarce on Efate (Erskine 1853 pp 335), likely due to the incredibly large numbers of traders operating in the New Hebrides (Erskine 1853 pp 487). While the Sandalwood trade was undoubtedly carried out on Efate, it is not known whether it was harvested on Nguna or Pele.
Facey (1981 pp 302) suggests that Nguna and Pele were likely too small to have received much attention from these early traders. No wild Sandalwood can be found on Nguna today.

After Cook, the most comprehensive writing on the islands of Efate and its satellites was published by Captain John Erskine after a cruise in 1849. He provides the following detailed early description of the people of North Efate:

“They were of large stature and regular features, some having straight or almost aquiline noses, good foreheads, and beards of a moderate size… their dress… consisting of a broad belt of matting, seven or eight inches wide, very neatly worked in a diamond pattern of red, white, and black colors, with a species of maro suspended in front. Many of them had their skins tattooed, or rather covered with raised figures, the arms and chest being the parts generally operated upon; the cartilage of the nose was frequently pierced, and filled with a circular piece of stone, and the lobes of the ears always so, large ornaments of white shells, or of tortoise shell, being hung from them, so as often to extend the orifice to a great size. Round the arms, and, in some cases, round their ankles, they were handsome bracelets, made of small rings ground out of shells, exactly resembling chain armor, and so neatly strung together in alternate black and white rows or figures that the inside resembled a coarse woven cloth. Garters of a green leaf were often tied tight round the leg, under the knee; and, in one or two instances, the crisp hair, which was in general of a moderate length, was gathered up into a large topknot, colored yellow by lime, and a neat plume of cocks’ feathers, attached to the scratching pain, inserted in it…. The women would were generally tall and thin, their hair cropped close to the head, and the skin occasionally marked with figures… Their dress… consisted of a somewhat broader waist belt, and a square map in front, resembling an enlarged maro. To this must be added however the singular appendage of a tail, made of grass or matting, the end is being a loose fringe of a foot and a half long, and the whole suspended from the waist belt, and reaching nearly to the calf of the leg.” (Erskine 1853 pp 324-3332)

Arriving on Nguna in 1870, Mary Milne, the wife of Reverend Peter Milne described the traditional adornment characteristics of the Ngunese:

“The men...have a bracelet...made of white and amber shell beads, which are worn above the elbow and which are highly prized. A large pearl-shell is suspended by a chord around the neck- I have seen some with the center of a common blue plate. The women...wear very little in their ears, only a small ring of tortoise shell.” (Don 1977pp 15).

In 1875 Commodore Goodenough describes that among the Ngunese:

“they all paint the face black and red, and have an ornament round the neck a pearl shell...Their noses are pierced, and they carry in it a ground down piece of shell” (Goodenough 1876 pp 293)

Visiting in 1880, missionary Robert Steel also confirmed that the Ngunese wore shell decorations (Steel 1880 pp 220), and further described their appearance as:

“well-built and strong, but fierce and painted savages. They wear little clothing; the men are almost naked, but wear many ornaments of shells and beads, and frequently have cock’s tail feathers stuck in their hair” (Steel 1880 pp 242).

In 1845, the Reverend George Turner described another cultural practice which was reliant on marine resources. He noted that traditional houses were decorated, often copiously, with the bones of fish and land animals (Turner 1861 pp 393). In 1849 Erskine noted that the North Efate village common houses were filled with:

“every conceivable bone of birds and fishes, mingled with lobster shells and sharks’ fins” (Erskine 1853 pp 332)

In 1849 Erskine noted that the habit of collecting these bone and shell ornaments was so passionately followed that trade in these items created a veritable market among tribes on Efate and other islands (Erskine 1853 pp 332). Canadian anthropologist Ellen Facey asserts that many of these bones belonged to enemies whose trophied heads were

“consumed and the skull and jaws hung up in the rafters of the chief’s varea” (Facey 1981 pp 300).

On a visit to Utanlangi Village (Nguna) in 1875, Goodenough also observed a hut that was decorated with

“no end of bones of turtle and pigs and fish hung from long strings” (Goodenough 1876 pp 292).
These early descriptions from the Nguna and Pele area provide irrefutable evidence that the people of North Efate did utilize marine resources. Most commonly highlighted however is the non-consumptive use of these resources, including personal and home decoration with shells and bones. The importance of marine resources to subsistence, and the fishing abilities of Nguna and Pele residents is not clear. Captain Cook felt that the ni-Vanuatu of the period were a far cry from the sea people he had observed in the rest of the Pacific. In his diaries he wondered to himself whether the islanders of the 18th century were either bad fishers or suffering from a lack of fish (Cook et al. 1955pp 503).

Certainly coral reef resources were plentiful around Nguna and Pele. Commodore Goodenough’s ship logs confirm that reef locations around Nguna and Pele in 1875 were identical to those of the present day, and that they were comprised of

“fine terraces of coral very clear all round the North end of Vate (Efate)” (Goodenough 1876 pp 318),

In 1890 the reefs in the straights between Efate and Pele were described in flowing prose:

“take a look now into these depths. Mark the varying shades of the gay coral. Notice the forms into which it is built. There are sprays, and branches, and trunks of trees. They arc of every lovely tint. The tiny polypi have erected a forest. They have laid out gardens, rolled out plateaus, built arched passage ways, done their sweet will in everything. Wonderful zoophytes! In an out amid all the beauty glide an infinity of creatures in shell, and skin, and scale. You observe that the beach far away looks like a mere rim of white sand.” (Adams 1890 pp 52)

Cook’s assessment of the fishing abilities of 18th century ni-Vanuatu is corroborated by more recent ethnographers (but contrast with Quiros above) who assert that:

“the natives cannot be said to be very skilled, and fishing on the open sea is never practiced…the fishhook was unknown in the New Hebrides” (Speiser & Stephenson 1990 pp 141-143)

Much to the delight of early European mariners and traders, they were able to trade property and other valuables with the natives.
“for a few hatchets, fish hooks, and other things” (Steel 1880 pp 132).

Observations on fishing correspond well with the archaeological evidence that suggested that Lapita settlers were highly terrestrially focused, and suffered from complete absence of fishhook remains. One piece of maritime technology that was undoubtedly widely used in Vanuatu, however, was the dugout canoe. The earliest Lapita immigrants must have traveled to Vanuatu in large ocean-going canoes Figure 26.

More recently, the letters and diaries of early European settlers often contain stories of canoe use. For example the reverend John Patton recorded that on Tanna island, locals took regular night fishing trips in canoes (Paton 1894 pp 265). In comparison to other Pacific Island countries, the quality of the contemporary canoes in Vanuatu have been both praised (Erskine 1853pp 334) and derided as substandard (Gunn 1914 pp198; Haddon et al. 1975 pp 14). Along with many other aspects of material culture, canoes are also unfortunately not preserved in the archaeological record. Thus the continuity and distribution of use as well as design sophistication in Vanuatu is difficult to assess.

Figure 26 Drawing of a canoe from on page 186 (Bonnemaison 1996). Most common type canoe found in Vanuatu today; small and roughly carved (Hermann & Bonnemaison 1975)

Vanuatu is an incredibly diverse nation, and it is to be expected that some groups used marine resources more than others. Steel was surprised by the local knowledge of reef diversity, commenting that in some groups:

“there are native names for ninety-five salt-water and for sixteen fresh-water fish” (Steel 1880 pp 208)

The following description by missionary William Gunn vividly describes the fishing practices of Futuna Island in 1914 and provides contrast to the view that ni-Vanuatu people as a whole were incapable seamen:

“The most assiduous fishers are in the southern islands. Their methods are very numerous, some of them almost ingenious; by hook and line; by net and basket; large fish and turtles speared; the smaller fish sometimes killed with bow and arrow. Shell-fish are caught on the reef by day, or, with the aid of torch-light, by night.” (Gunn 1914 pp 197-198)
Obviously, this description was written nearly 80 years after the first white visitors landed on these islands with some permanence, describing some practices developed after the addition of critical equipment like fish hooks and diving masks. He also describes potentially more endemic forms of fishing on the adjacent island of Anytium;

“Below high-water mark a line of stones is laid in a semi-circle, and the fish, brought in at full tide, are entrapped as it ebbs, and killed in the shallow pools. Or coconut leaves, kept in position by heavy stones, when swayed by the moving sea, deter the fish from going out and they are caught at low tide. In some islands the juice of a certain plant, thrown into the water at low tide, kills the fish, without injuring them for eating.”
(Gunn 1914 pp 197-198):

However, records from Efate do not detail the same indigenous maritime focus as found on other islands. Amassing a series of reports of net and spear use for fishing from throughout the archipelago, Speiser received none from Efate or its offshore islands (Speiser & Stephenson 1990). The lack of fishing technology on Efate contrasts sharply with many other pre-contact Oceanic societies which had finely developed fishing knowledge and practices (Johannes 1989; Kirch 1985). It is likely that the people of North Efate focused instead on terrestrial resources, and were clearly “bush” people (see Roe 2000 for a description). On Erskine’s visit to North Efate in 1849, Erskine records the local use of terrestrial resources like yams and pigs but does not mention fish or other marine resources (Erskine 1853). Specifically referring to the people of Nguna, Peter Milne commented that

“The people are all tillers of the soil, whether bushmen or shoremen. The latter do some fishing from their canoes, but their staple articles of diet are the fruits of the soil”
(Don 1977pp 20).

5.3 Summary & Conclusion

This Chapter presents archaeological evidence suggesting that 3500-3000 years before present, early Vanuatu settlers selected homesteads near sources of marine resources, which had important subsistence and cultural values. Interestingly however, no advanced harvest technology, like fishhooks, has ever been recovered from early ni-Vanuatu settlement sites. This, and the prominence of agricultural remains in archaeological excavations, leads paleoecologists to conclude that Lapita livelihoods were overwhelmingly territorially focused and only harvested marine resources in shallow areas. The Chapter points to the archaeological record to suggest that these shallow nearshore marine resources were subjected to Blitzkrieg style harvest, leading to rapid local depletions and continuous declines in the abundance and size of target organisms. Ultimately the evidence provided in this chapter strongly suggests that ancient marine use in central Vanuatu was either unrestricted or else customary management regimes were ineffective.
The second part of the Chapter presents area-specific pritings and observations over the last 300 years to provide a lens to examine the extent of early marine uses, processes and marine governance institutions on Nguna and Pele. Considered as a whole, these sources strongly suggest that the islands of Nguna and Pele did not have a well-developed maritime culture. Residents primarily engaged in terrestrial subsistence activities, even in the presence of one of the most extensive reefs and intertidal seagrass areas in the archipelago (Chambers et al. 1989a). In line with Efate’s archaeological evidence, the oral and written evidence suggests that people of North Efate during the 18th and 19th centuries did utilize sea resources, but primarily and most commonly in non-consumptive ways (e.g. for personal or home decoration). The perceptions, by a multitude of first hand observers, that early residents on Nguna and Pele were not expert seamen indicate the likelihood that few marine institutions had been developed to manage resource exploitation. Thus this chapter concludes by rejecting the widely-held presumption that all early Vanuatu inhabitants had developed complex systems of customary marine resource management.
CHAPTER 6 - TABOOS AND MPAS: 'CUSTOMARY' MARINE MANAGEMENT PARADIGMS

“Revision is the lifeblood of historical scholarship. Interpretations of the past are subject to change in response to new questions asked of the evidence. There is no single, eternal, and immutable “truth” about past events and their meaning.” (McPherson 2003)

6.1 Introduction

This chapter explores and critiques the prevailing paradigms that ancient or customary marine conservation practices were ubiquitous in the islands of Vanuatu. At the outset, I describe the institutions and practices widely held to represent ancient marine management in the Pacific, including the oft cited marine taboo. I then explore local factors which may have prevented or restricted the uptake of customary marine management on the islands of Nguna and Pele. Finally, this chapter presents background information about the contemporary MPA phenomenon in Vanuatu. It examines the ways in which communities are legislatively enabled to establish MPAs, and gives an historical account of their recent popularity in Vanuatu.

6.2 Ancient marine management paradigms

Many contemporary ni-Vanuatu communities are actively implementing management regimes purportedly to curb anthropogenic impacts on marine resources and ensure resource continuity and longevity. Due to the widespread nature of marine management initiatives throughout the archipelago, there is a widely-held view that conservation-focused marine management is endemic to all islands of Vanuatu and the Pacific. This view contends that Pacific Island people have, over thousands of years, conscientiously and systematically employed techniques to directly enhance stocks of nearshore marine resources (Hickey 2006; Johannes 1978).

The prevailing paradigm in Vanuatu’s marine management sector holds that islanders have been successfully and sustainably managing marine resources for millennia (eg. Hickey 2001 pp136).

“If management means regulating who may fish, when and where they may fish, what methods they use, and/or what they may catch, then fisheries management by villagers themselves has been widespread in Oceania for centuries.” (Johannes 1998b)

Kenneth Ruddle summarizes the commonly held perception that spatial closures, called taboos, are the ubiquitous customary form of MPAs in the Pacific.

"Marine resource conservation measures were traditionally employed by Oceanian communities to ensure sustained yields. Among these were the live storage or freeing of surplus fish caught during spawning migrations; use of closed season; the placing of taboos on fishing areas; the reservation of particular areas for fishing during bad weather; size restrictions; and, in recent times, gear restrictions.” (1989 pp 81)
Widespread throughout the Pacific today, the institution of taboo was recently the subject of a paper by several key environmental leaders from the Pacific region (Caillaud et al. 2004). In the opening paragraph, these authors assert that the taboo is a marine conservation strategy that was "developed over many centuries and transmitted from generation to generation."

The ancient management paradigm exists also at the highest levels of government in Pacific Island countries. At the Ministerial Conference on Environment and Development in Asia and the Pacific (2000), the ministers jointly declared that:

"Protected areas for nature conservation have been an integral part of Pacific Island countries for thousands of years. Pacific Island reserves were established by taboos to prevent anyone from entering the area, with the express purpose of allowing the wildlife to recover."

In the above mentioned papers however, as is the case in many studies arguing that effective pre-contact marine management existed in Oceania, little to no evidence is given to back up the assertions of ancient conservation. A close reading of the references and literature cited in these writings shows the heavy use of secondary sources, many of which contain no citations themselves. For example, in a paper entitled "Traditional marine resource management in the Pacific", Gary Klee writes about the extensive system of effective marine resource taboos (Klee 1985 pp 193) and cites page 27 in Meller and Horwitz as a reference (1971). Without providing a reference of their own, Meller and Horwitz wrote that

"an elaborate taboo system reinforced the essential principles of conservation and preserved the islands’ natural resources". (1971 pp 27)

A reliance on secondary or anecdotal sources may have led, in part, to the current assumptions regarding the longevity, distribution of conservation focus of the Pacific marine taboo. Rather than accepting these assertions without question, it is critical to ask what exactly is (and was) the Pacific Island taboo? Is it, as claimed above, a prehistoric and pre-contact Pacific institution developed to directly and sustainably manage natural resources? Although currently used by island communities throughout the Pacific today, does the taboo represent the most or only appropriate mechanism for resource management? Unfortunately these questions are difficult to answer because, like so much of culture, these institutions are not preserved in the archeological record. However, the archaeological record can provide important insight into the question of ancient marine resource use and management in Vanuatu.

6.3 The taboo as a tool for resource conservation?

The taboo is the most oft cited example of ancient marine management in the Pacific (Caillaud et al. 2004). However in light of the above mentioned archaeological evidence, it becomes necessary to examine the equally likely possibilities that 1) the taboo was not an effective management regime or 2) that it was used primarily for a non-conservation purpose.
6.3.1 Taboo as a system of social prohibitions

Colding and Folke reviewed the literature on contemporary informal taboo institutions around the world that contribute to natural resource management. They acknowledge the difficulty in distinguishing “among ecological, social, or religious origins and functions of resource and habitat taboos” but suggest that they are essentially informal socially-focused institutions of prohibitions (Colding & Folke 2001). Although thoroughly reviewing the contemporary literature, Colding and Folke do not review primary observations from sources before 1912. But what were taboos like centuries ago?

The first published reference to taboo was made by Captain James Cook in diaries from his voyages through the Pacific Islands in the late 17th century. In an account from the Hawaiian islands, Cook writes

“the priests, to prevent the intrusion of the natives, immediately consecrated the place, by fixing their wands round the wall by which it was enclosed. This sort of religious interdiction they call taboo’ a word which we heard often repeated during our stay amongst these islanders, and found to be of very powerful and extensive operation” (Cook & King 1793 pp 157)

The next formal description of the Pacific Island taboo comes from David Darling in 1835. He recounts that

“in all the Marquesan islands almost every thing has a tapu attached to it less or more. The Tapu is making of a thing or person sacred, or separating them from another thing or person, a prohibition. Sometimes they are only for a time and then removed, other Tapus are continual, such as sacred places” (quoted in Thomas 2000 pp 236)

In his view, the taboo is implemented for the benefit of particular individuals and

“was bewilderingly various in its application: some things and people were tapu, others were always tapu....tapu might be applied to places, activities, times, people and objects” (Thomas 2000 pp 234).

Codrington, speaking for the entirety of Melanesia, also perceived taboos as prohibitions which would benefit certain individuals. He noted that taboos could be placed over locations and objects to separate them from common use including

“a path, trees, part of the sea-beach, a canoe, a fishing-net” (1891 pp 216 )

Beale however suggests that rather than serving as an individual prohibition, the taboo institution was the foundation of human law and order in early Pacific society.

“As if to compensate for the absence of a moral code, they had raised the custom of tapu to a higher place in their social life than the provisions of the Decalogue have attained in ours” (Beale pp 125).
In the Philippines too taboo was perceived to be a form of early legal institution, and

“entirely a creation of superstition, and its ‘thou shalt not’ often touched matters of deep import (Stephens & Bolton 1917 pp 164).

More than any other function, the taboo institution likely served as a form of social control, and reinforcement for local power hierarchies.

“the motivation for such systems has been the preservation of social order and local power structures. Since fishing has been to Pacific Islanders their main source of food and employment, control of access to fishing ground is tantamount to political and social control. This may explain why many of the traditional systems are now in the process of disintegration, even though the need for conservation is as great as ever.” (Panayotou 1989).

Similarly Beale asserts that the taboo was likely

“exercised mostly by the chiefs, used to maintain their power and dignity” (Beale pp 125).

Found throughout the Pacific region, the use of taboo may, according to some early observers, have been more prevalent in Polynesia than in Melanesia.

“The tapu or tambu of Melanesia is not so conspicuous in native life as the tapu of Polynesia; and it differs also perhaps in this, that it never signifies any inherent holiness or awfulness, but always a sacred and unapproachable character which is imposed. Some thing, action or place is made tambu or tapu by one who has the power to do it, any one whose standing among the people gives him confidence to lay his character upon it.” (Codrington 1891 pp 215)

Regardless of its original distribution, by the end of the 18th century the taboo institution had gained widespread recognition in Europe. Captain Cook’s travels were well known, along with his descriptions of the exotic institution of taboo. As the word became commonplace in households across Europe, it was soon adopted as a formal part of the English language in reference to social prohibitions (Horwitz 2002). In 1890, the taboo was the subject of a lighthearted romance novel entitled The Great Taboo (Allen 1890), and soon after played an important role in Herman Melville’s adventure story of the Marquesas Islands (Melville 1900). The most famous European evocation of the taboo was Sigmund Freud’s treatment of the concept in his book Totem and Taboo (Freud 1950). In an example of what he called ‘avoidance behavior’, Freud cites a customary taboo in Vanuatu which instructs young males to avoid contact with their mothers and sisters (Freud 1950 pp 9).

Most travelers to Oceania in the 19th and 20th centuries had read Cook’s accounts of the taboo and perhaps even used the word in their home country before ever setting foot in the Pacific. Considering the linguistic and cultural diversity found throughout the Pacific, it is of
considerable interest that a single word was used so prevalently. Cook makes reference to other words which were used to indicate taboo in other locations. Thus, one may wonder whether this word became a tool for shared communication between early European settlers and the ni-Vanuatu, a proxy for the critical word ‘no’. Would the word taboo have become so frequently used throughout the Pacific had it not been for the presence of foreigners who did not speak indigenous languages? Also worthy of discussion is whether or not taboos were declared more frequently and more widely in response to the dominating presence of foreigners. For example, perhaps chiefs used the taboo as an attempt to curtail the encroachment of the ‘whiteman’ on their land. In summary, it is quite possible that European visitors assisted in the ‘taboo-ification’ of the region, having arrived already pre-prepared to evoke and fully utilize the taboo to their advantage.

Beale confirms that the word and institution of taboo was a very useful instrument for the Pacific Island missionaries, giving them “not a bad substitute for government” (Beale pp 125). Prohibitions were valuable, and much required in Christian doctrines. Noting the value of the taboo to Europeans in the Pacific, Codrington argues that

“The tambu is too convenient an institution to drop when the original sanction of it has ceased to operate; a Christian teacher therefore does not hesitate, as a man of position in society, to set a tambu” (1891 pp 216)

Using a word that was assumed to resonate with local residents, missionaries felt they could adopt and incorporate it into their own Christian teachings.

“Both Polynesia and Melanesia has strong systems of taboo and a new religion without some taboo would have been no religion at all...the Sabbath was itself a functional substitute and the islanders accepted it because they valued the taboo system and felt it met a social need.” (Tippett 1987)

6.3.2 Taboo as a resource management institution

It is clear that taboos were used for a variety of purposes by Europeans and indigenous Pacific Islanders. Were taboos also used to sustainably manage natural resources? Williams first noted a natural resources taboo in Fiji in the 1840’s. He described how preparing for a feast months in advance,

“a tabu is put upon pigs and nuts” (1859 pp 115)

Williams also observed that after the death of a king in Fiji,

“the coast for four miles was made tabu, so that no one might fish there; and the nuts, for at least six miles, were made sacred ” (1859 pp 155)

In 1861, Turner described eight distinct forms of natural resource taboo used in Polynesia, all of which were enacted over trees and land (1861 pp 294-296). In the Solomon Islands, certain sections of the beach were permanently taboo to keep uninitiated people and women away
There too, prohibitions existed over the use of sea resources, specifically the required abstinence from sea food consumption by a new father (Codrington 1891 pp 229). Rather than being a collective prohibition however, this taboo was practiced by a single individual for an unspecified length of time.

In the early 20th century, Malowinski describes the taboos associated with canoes and seafaring, and rules of behavior in the village during the absence of men on voyages in the Trobriand islands (Malinowski 1922 pp 230,484). He also mentions natural resource taboos, or prohibitions, on coconuts and betel nuts. These taboos were established to allow them time to mature and ripen, but also to protect those which were located

“too far away from the village to be watched.” (Malinowski 1922 pp 425-426)

Margaret Meade wrote about hereditary titles in Samoa which conveyed

“power over the sea to tabu certain fish or shellfish so that many would accumulate” for distribution (Mead 1937 pp 290)

In the last two decades, much has been written about the taboo as a marine management institution. It is widespread throughout the world today, and often has a distinctive natural resource management aspect. Colding and Folke (2001) identify several types of taboos and highlight their conservation application:

Table 4 Typology of taboos and a description of their potential ecological benefits from Colding & Folke (2001)

<table>
<thead>
<tr>
<th>Taboo Category</th>
<th>Conservation functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment taboos</td>
<td>Reduce hunting and harvesting pressures on wildlife and plants, e.g. conserve local populations of species</td>
</tr>
<tr>
<td>Temporal taboos</td>
<td>Same as segment taboos. Promote stock recruitment of species, protect spawning grounds of fish</td>
</tr>
<tr>
<td>Method taboos</td>
<td>Same as segment taboos. Protect fish stocks.</td>
</tr>
<tr>
<td>Life history taboos</td>
<td>Maintain stock recruitment of species by protecting vulnerable stages in a species' life history, based on the individual's age, size, sex, or reproductive status</td>
</tr>
<tr>
<td>Species-specific taboos</td>
<td>Offer total protection to threatened, endemic, and keystone species. Preserve local and global biodiversity</td>
</tr>
<tr>
<td>Habitat taboos</td>
<td>Maintenance of biodiversity and ecological services.</td>
</tr>
</tbody>
</table>

In a relatively recent ethnographic account of the people of Marovo lagoon in the Solomon Islands, Hviding describes two contrasting taboos on fishing practices. The most common was a general taboo which was rotated among reefs and
Another marine taboo of the Marovo was

‘applied to the entire tuna-fishing grounds extending into the open sea.’ (1996 pp 269)

Thus marine taboos in the Pacific have been diversely applied, even within the same geographical area, and often without a conservation focus. There is no single standard or otherwise definitive customary marine taboo institution in the Pacific region.

6.3.3 Taboo in Vanuatu

The earliest mention of taboo in Vanuatu comes from the diaries of Captain Belcher in 1843. Then, the word was used by the Europeans to describe the no-go boundary they had designated around their camp which locals were not to enter. He describes how he was

“frequently annoyed by the natives intruding too closely on our tabu lines” (Belcher 1843 pp 59)

In the diaries of Captain Erskine from 1853, a story is recounted in which a young ni-Vanuatu man was so terrified by the demonstration of a quill-tube musket explosion that he

‘fell ..as if shot, and begged that no experiment of the kind be repeated, exclaiming tabu, tabu if anyone approached the lock of either a gun or musket” (Erskine 1853 pp 324)

Further, Erskine’s diaries record that when locals on Efate island were offered tobacco, they respond in the negative saying it was “taboo” to smoke (1853 pp 325). Land and objects were also tabooed in Vanuatu. In his diaries, missionary Paton describes how the chiefs of Aniwa had placed a taboo on construction of his mission station until it was paid off (Paton 1892 pp 76). Sandalwood traders forcibly took coconuts that were under local taboo prohibitions as an insult to the villagers (Erskine 1853 pp 326). Christian missionaries would also ignore local taboos so as to undermine the authority of island chiefs (Gunn 1914 pp 23). Missionary Gunn himself, along with many other early white settlers became frequent users of the word taboo. For example, Gunn relayed to one young man that

“It is tapu for you to work at the house of God when you are bringing back heathenism. If you cut your hair you may work” (Gunn 1914 pp 104)

In his 20th century Ethnography of Vanuatu, Spesier, dedicates an entire section to the institution of taboo (1990 pp 316-317). He suggests that the taboo is

“encountered throughout the group, and means nothing more than a prohibition whose infringement is visited with magic penalties”. 

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and distinguishes between

“taboos of ordinary people which are respected to a variable degree and those which have to be reinforced with the help of a powerful man who gives the taboo added efficacy with his more potent mana”.

Spesier also observed that taboos were publicized by making

“marks on objects which are known to everyone and which have roughly the same significance as prohibition notices in Europe.”

Steel was the first, in the late 19th century, to describe the specific beliefs and ‘magic penalties’ associated with breaking a taboo in Vanuatu. He noted that sacred men

“lay tabus upon certain places, trees, and food, when it is a forbidden thing to go to these places, touch or eat of these fruits, for so many moons. These tabus are very oppressive, for it is believed that if they are broken, disease or death will follow.” (Steel 1880 pp 25)

Local people were under no illusions about the strength of chiefly taboos, and missionary Patton confirmed that

“the Natives had an extraordinary dread of violating the taboo, and believed that it meant death to the offender or to some one of his family.” (Paton 1892 pp 357)

and Inglis recorded that

“death is the penalty of touching the forbidden fruit.” (Inglis 1854 pp 62).

Written records from Vanuatu also confirm that taboos were, at times, placed on natural resources. In 1850, writing about Tanna island, Inglis recounts witnessing a large dance

“to celebrate the ripening of the breadfruit, and removal of the tapu from the tree.” (1854 pp58-59) and noted that “the tabu is employed in all the islands to preserve persons and objects. The cocoa-nuts are laid under a tabu till all the other crops are planted, or till some feast is celebrated” ( pp 62).

In 1890, he further clarified the use of natural resource taboos, describing how closures were placed by sacred men to stockpile natural resources in preparation for great feasts in which

“every kind of common food was tapu, not only for days but for weeks, and even for months, till the bones of their back and shoulders were far more prominent than the muscles” (Inglis 1890 pp 152)

In the Southern islands of Vanuatu in the early 20th century, Gunn commented that
“The institution of 'tapu' exists in great force. The sea has been tapu, the roads and even the water.” (Gunn 1914 pp 19)

In his view, chiefs would declare taboos so as to claim the best resources for themselves, including

“good fishing places, good water springs, etc.” (Gunn 1914 pp 213).

Speiser found that in 1915, most of the taboos in Vanuatu placed prohibitions over human behaviour, sacred sites, and fruits and trees resources. However without specifying the reason, duration or geographical location he mentions one instance of a taboo that was declared by very high ranking men over a

“stretch of the coast”

It is not clear whether this single instance of a marine taboo prohibited or controlled the use of resources or was simply marking a coastal sacred site. Also noteworthy is Speiser’s single mention of rules and access controls over the sea. In describing mortuary rites in the Southern island, he notes in passing that

“in Tanna and Futuna people would bathe after a burial but kept away from the sea afterwards for several days” (Speiser & Stephenson 1990 pp 286)

6.3.4 Taboo on Nguna and Pele

The ethnographic evidence from Nguna and Pele is noticeably silent on the existence of marine resource taboos. In only one instance have the stories recorded on Nguna and Pele (including the diaries of Milne, transcribed stories of Schütz or anthropological notes of Facey) made mention of any kind of prehistoric limitation or restriction placed on a marine resource, and then only indirectly and associated with a single cave. In his diary, Peter Milne records this story:

“In a small cave on Pele...was found a large shell called Paiga...greatly feared by the natives. They believe that if a man has ill-will toward another man and wishes him to be out of the way...some remains of food left by the doomed man are put into the shell. The spirit of the cave eats the food, the man takes some disease and dies. No heathen would dare to enter the cave, far less to touch the shell” (Don 1977pp 27).

Recently Johannes made note of several contemporary taboos employed for marine management on the central islands of Vanuatu (Johannes 1998b), and we know from previous chapters that they exist on Nguna and Pele. But what of the taboo institution on Nguna and Pele? While certainly in use today, was it used in the past? If so was it ever applied to control

18 Paiga is the contemporary local language name for the Triton shell _Charonia tritonis_, indicating that this pre-contact ecological nomenclature has remained constant. However, no contemporary local informants were able to confirm or recognize the elements of this story.
or manage sea and coastal resources? Peter Milne arguably produced the most comprehensive written account of Nguna and Pele in the last 200 years. During his nearly half-century of tenure on Nguna, he produced 12 diaries about daily life and local people, each containing over 1000 pages. The 12 original volumes of Peter Milne’s diaries are housed in the archives of Otago’s Hocken Library and have never been published. Contemporary scholar Gordon Parsonson however has read the diaries in their entirety several times and is in the process of transcribing Milne’s complete writings. In response to specific questions about the institution of taboo on Nguna and Pele, Parsonson writes

"I have so far found nothing in the diaries, which suggests the laying of taboo on reefs or particular fishing spots... I very much doubt whether taboo existed on any major scale". (personal communication 2009)

Donald Crump was the son of missionary Ken Crump on Nguna. He was born on Nguna in 1940 and lived there until he was nine years old. He recalls that fishing was a major activity on Nguna and most people owned a dugout canoe for daily reef fishing. Never during his tenure on Nguna however did he hear of any village declaring a taboo over the sea, reef or coast. In contrast, fishing was practiced day and night, and he recalls several villagers beginning to experiment with new and more efficient ways to catch fish, including the production of goggles and the use of dynamite.

Anthropologists and linguists visiting Nguna and Pele in the mid 20th century did find reference to taboos but not over marine or coastal resources. Guiart recorded the existence of a strong taboo on Efate prohibiting the marriage between a man a women of the same ‘namatarao’ totemic clan (Guiart 1964 pp 99). Later Schutz recorded stories on Nguna which tell of the dangerous taboo sacred powers that surround newly ordained chiefs (Schütz 1969b pp 265).

Today, of course, chiefs frequently establish taboos over the reef, although local informants claim these are the first in living memory (Johannes 1998b). By the late 1970’s however, a visiting anthropologist recorded the local opinion that early Ngunese chiefs had always practiced direct resource management. Her informant suggested that this was accomplished by

“putting tabus on certain crops or areas to ensure a sufficiency, especially for feasts to propitiate the spirits” (Facey 1981 pp 301)

Apart from Facey’s single informant, there is no other evidence suggesting that taboos were established on Nguna in order to conserve or otherwise maintain natural resources over the long term.
6.4 Historical diversity of cultural expression

This review provides evidence that the marine taboo is a relatively new phenomenon on the islands of Nguna and Pele. But other groups in Vanuatu obviously did possess significant knowledge of the sea and marine resources, so why was this expertise not homogenously distributed throughout the archipelago?

6.4.1 Inter island cultural isolation and marine use knowledge

The first European visitors to Vanuatu observed distinct differences in the appearance of residents among the islands. Considering mobility of the first Lapita colonizers three millennia ago, one would expect to find a relatively homogenous people, unless events and circumstances led to a decrease in inter-island mobility and genetic/cultural mixing. Archaeological evidence suggests that prehistoric trade networks for customary artifacts did exist between the islands in Vanuatu. Evidence of early inter-island exchange also hails from Vanuatu’s nearest neighbors (Aswani & Sheppard 2003; Davenport 1962). These trading networks may explain the acquisition of marine artifacts (like decorative shells and bones), but why didn’t the people of Nguna and Pele also adopt fishing practices or a sea-focused lifestyle?

Darrell Tyron describes what he calls a “network society” where trade connections between islands existed but where each locale sought to “preserve its autonomy in a dialectic between linguistic intelligibility and unintelligibility”. In other words, islands and the communities there engaged in trade, but maintained an intentional degree of isolation, linguistic and cultural. Bedford and Spriggs (2008) present substantial archaeological evidence that a homogeneous ni-Vanuatu material identity was never maintained throughout the archipelago, but rather the islands were characterized by “regional diversification in traditions after Lapita”. They identify several cultural ‘boundaries’ where archaeological finds show a change in substance and composition. These permeable boundaries are also well aligned with contemporary cultural governance and political practices (Bonnemaison 1996 pp 201)

“There are a number of specialized cultural practices noted by early [Vanuatu] ethnographers (Speiser 1996) that are unlikely to have developed independently, but rather are likely indicators of some form of interaction” (Bedford & Spriggs 2008)
It is interesting that in 1776, when Captain Cook posed gestured questions to residents of Malakula island, he sensed that their geographic knowledge did not “exceed the limits of their horizon” (Beaglehole 1961 pp 504). Practical outcomes of the cultural isolation are made obvious when one considers the incredible linguistic diversity within the archipelago Figure 39, where even neighboring communities speak distinct languages.

Figure 28 Linguistic diversity and geographic distribution of contemporary languages in Vanuatu (Bonnemaison 1996) page 171.

But how did an ocean going vicarious people suddenly adopt an isolative attitude? Spriggs asserts that at some point towards the end of the Lapita period, the early residents of Vanuatu became ‘inward looking’, reduced their mobility and contracted preexisting inter-island trade networks (Spriggs 1997). He makes a case that inter-island migration has remained negligible throughout much of prehistory (Spriggs 1997 pp 136). Genetic studies confirm that there are several distinct generic groups with today’s Vanuatu (Cox 2008), strongly suggesting that indiscriminate mixing and cultural homogenization did not occur in the archipelago’s ancient history. In the 19th century, social commentators noted that

“the principal permanent difficulties to be encountered in prosecuting missions in New Hebrides are, the small number and smallness of the tribes and the diversity of languages or dialects” (Inglis 1854 pp 69).
The pervasive inward looking mentality of the diverse ni-Vanuatu island groups helps to explain why maritime focused activities, knowledge and institutions did not develop on Nguna and Pele to the extent that are assumed to have done in other parts of the archipelago. The flexibility of the network society, where trade was permitted also helps to explain how the people of Nguna and Pele were able to decorate themselves and their homes with marine shells and bones to the extent that they did.

6.4.2 Nguna and Pele’s connections with the external

Despite limited interaction with distant islands within the archipelago, there have likely always been strong links between Nguna and Pele Islands and the Island of Efate, separated at the most distant point by only 6 kilometers. All of today’s North Efate residents share the Nakanamanga language (Ray 1887 pp 409), as well as similar customary practices and social organization (Espirat et al. 1973), and mythical stories (Capell 1938). North Efate and its satellite islands comprise an obviously distinct socio-cultural area within central Vanuatu (Facey 1981 pp 5). Residents of North Efate are described by several different early observers as lighter skinned, taller and closer in appearance to Polynesian people than the inhabitants of other islands in the New Hebrides. Several early observers hypothesize that the people of Efate have significant infusions of Polynesian blood and culture through regular Samoan and Tongan in migration events (Gunn 1914 pp 190-191; Speiser & Stephenson 1990 pp 52; Turner 1861 pp 392). Linguists also assert that the languages and beliefs of central Vanuatu are heavily influenced by Polynesian links (Capell 1938 pp 68).

In addition to links with other parts of the Pacific, North Efate has critical historical links with other areas in central Vanuatu, for example the shared Nakanamanga language with the island of Tongoa to the North. Existing Ngunese stories describe how Nguna’s language came to be understood on Northern islands (Taman Onesmas, personal communication), and others suggest some cultural continuity with these islands through familial networks (Schütz 1969b pp 176-178). For example, one popular story recounting the origin of human settlement suggests that Nguna was originally peopled by a chief from Siviri on North Efate (Schütz 1969b pp 116-117). Another custom story tells of regular canoe travel from Nguna to Emau, Mataso and even Erromango island some 160km to the Southeast (Schütz 1969b pp 21, 58-59). Surprisingly, many of these travel stories tell of inter-island travel on rafts of coconut trunks lashed together! This in the context of a people whose ancestors once made long oceanic voyages in sophisticated canoes! These stories suggest that not only did the ocean going-nature of the people on Nguna and Pele diminish throughout history, but also that knowledge associated with the sea was not continuous.

Even the people of Nguna and Pele themselves did not represent a single homogenous population throughout history. Contemporary Ngunese leaders assert that at one time over 12 distinct languages existed on Nguna alone (personal communication Kenneth Tarisu- secretary of the Nguna Duruaki council of chiefs). The development of distinct languages at the island level suggests a significant degree of cultural isolation, particularly in the absence of major geographic barriers (Boas 1982). The hypothesis that villages on Nguna were isolated from

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19 Also referred to as the Namakurana language (Schütz, 1969 pp 176), Ngunese, Nguna language or more colloquially Nafsana (literally “talk”).
one another is corroborated by recent molecular evidence. Hagelberg and her colleagues found three major mitochondrial DNA lineages in existence on contemporary Nguna (Hagelberg et al. 2000; Hagelberg et al. 1999), a surprising result considering the small size of the island. But what could possibly have maintained village isolation on an island that only takes 8 hours to circumnavigate?

6.4.3 War, a major limitation on social relations and cultural transmission

Few other social institutions can limit the transmission of language and culture more effectively than can war. European cruises of discovery and trade throughout the archipelago during the 17th and 18th centuries provided eye-witness evidence that Vanuatu’s population was fractured by a widespread prevalence of tribal hostilities. In the very first European record of the archipelago, Quiros in 1606 observed that

“a strict territorial division seemed to prevail. Each group occupied a cove or part of a beach, but could not go beyond an invisible boundary.” (Bonnemaison & Penot-Demetry 1994 pp 10). And “No person of one tribe dared to go into the property or district of another (Quiros 1904b pp 368).

After a cruise throughout the islands in 1850, Inglis observed that

“war appears to be universal, The Missionaries in the New Hebrides have ascertained that the natives are occupied fighting for ten months in the year: we found more or less of it almost everywhere.” (Inglis 1854 pp 57)

He further emphasizes the isolated nature of local populations by declaring that

“no intercourse could have taken place among inhabitants of the different islands, since they possess no canoes that could sail from one island to another, or only very rarely.(Inglis 1854 pp 66)” and found “recently, since foreigners have been visiting them, a trade in canoes and other articles” (Inglis 1854 pp 66).

War was still prevalent throughout the archipelago decades later as Steel found that

“the men are almost always fighting, and the women, as on other islands, have all the work to do.” (Steel 1880 pp 207)

War on Efate was also prevalent. One of Vanuatu’s most heralded custom stories recount the attempts of a great Efate chief called Roimata to create a lasting peace in his war-torn kingdom. He was motivated to act because

“he saw war all around him, and every day men were dying” (Espirat et al. 1973 pp 290).

As late as 1849, Captain Erskine (1853 pp 17) noted that Efate island was broken up into separate communities “being constantly at war” with each other. War on Nguna and Pele was
no less frequent or severe. An old chief recounted to Reverend Milne that before Christianity had come

“we knew nothing- nothing but war war war” (Don 1977pp 22-23).

Milne noted in his diaries that conflicts were rampant throughout the islands of Nguna and Pele, tribe against tribe village against village. Even travel between the villages was a perilous undertaking, attacks could come at any moment. In order to permit at least some degree of inter-tribal communication, large stone walls called *nausaia* were constructed. These walls were patrolled on either side by warriors, and were used as a means of travel to other dominions for peaceful purposes like passing crucial information or to enable a marriage exchange (Facey 1981 p 299).

There is little doubt that for some time before Peter Milne arrived on Nguna until well into the 20th century, the tribes and villages on Nguna and Pele knew much hostility, conflict and isolation. Under these conditions, the diffusion of cultural knowledge would have been exceedingly difficult. The use of marine resources would have been a hazardous affair for locals, leaving them vulnerable to attack during trips to the reef and open sea. Harvest would have been opportunistic, carried out quickly, likely leaving little room for conservation strategies or stock enhancing taboos. What ancient marine management practices that may have developed before the period of hostilities in Vanuatu were almost undoubtedly disused over many generations.

6.5 Europeans, cultural change and marine resources on Nguna and Pele

With the somewhat fluid hindsight of history, it is possible to imagine that the effects of war paled in comparison to the changes that would begin in the late 19th century. The sustained influx of European traders, missionaries and colonists sparked an incredible, and often devastating, period of change in Vanuatu’s history (White & Lindstrom 1997). It is doubtful that any existing marine management institutions or practices were able to survive intact during this period when so much that was integral to early ways of life did not. It is important to assess the nature of these impacts in the context of our goal; understanding contemporary marine use and management practices on Nguna and Pele.

This section examines how European contact impacted local livelihoods in our attempt to understand the contemporary push to manage the reefs of Nguna and Pele. To do so, it synthesizes the existing information relating to Nguna and Pele’s social change over the last 140 years since Europeans first significantly interacted with the two islands. Written accounts are patchy, but they have been pieced together as comprehensively as possible in order to examine social and cultural changes. In contrast to other parts of the archipelago, anthropologists have paid scant attention to Nguna and Pele. However these two islands represent a fascinating case study for cultural change because according to Guiart, on Nguna and Pele,

“the influence of culture contact has been exceptionally strong” (Guiart 1964 pp 74).

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6.5.1 Forced change begins

On July 19th 1870 Reverend Peter Milne of Aberdeen Scotland was the first European\textsuperscript{20} to establish residence as a Presbyterian missionary on Nguna Island (Don 1918pp 1). The Milne’s were sold a parcel of land by the late chief Mariwota of Tukilasoa on which now sits the Taloa Presbyterian Church\textsuperscript{21}. Ironically the land was considered sacred and mortally dangerous, potentially indicating the local’s expectations of a short residence by the Christian missionaries (Facey 1981 pp 303). Contrary to the islander’s expectations however, Milne’s tenure on Nguna lasted for the next 54 years until 1924. He was succeeded in his post on Nguna by other missionaries, including his son Willie Veitch Milne, until 1956. There were other Europeans living on Nguna and Pele during the 20th century including a white shopkeeper, Jenny McCoy (Schütz 1969b pp vii) and the Pouillets, a French copra plantation family (Crump & McKenzie 2000 pp 21-22)

6.5.2 Beche-de-mer and Sandalwood traders

By the time Peter Milne had first set foot on Nguna, international “trade” with Vanuatu was already in full swing. Mrs. Milne observed that on Nguna, many local residents already spoke what she called “Sandalwood-English” (Don 1977pp 88). While the trade in Sandalwood is well known to have occurred in Vanuatu, the specific exploits of the traders is little known. Due to the fortunes involved in trading (particularly in Sandalwood), the precise location of harvested resources was be kept very much out of the public domain. Erskine observed that

\textit{“secrecy is preserved on all subjects by the traders”}. (1853 pp 814)

Ship logs indicate that the first beche-de-mer trading ships had arrived in Vanuatu by the end of the 18th century (Conand 1990 pp14). It is likely that these early traders discovered Sandalwood and bartered for all valuable items including pearls, pearl shell and turtle shell. The shallow seagrass beds and reefs around Nguna and Pele would likely have been an attractive harvesting site for early beche-de-mer traders. There was Sandalwood on Efate and possibly even on Nguna, however captain Erskine (1853 pp 814) records most Sandalwood activity on the southern islands of Tanna, Erromango and Anytieum. While the heyday of the industry was in the 19th century, it is nearly impossible to gauge the impact on Nguna and Pele, because, as Conand laments, “virtually no hard information exists” (Conand 1990 pp 15). What is clear however, is that the Sandalwood and beche-de-mer traders eventually focused their efforts on the trade in labour for Australia’s sugar industry. When Inglis traveled through the archipelago in 1850, he noted that

\textit{“for some years, the sandal-wood trade has been the principal traffic. Though many of the natives have gone on board trading vessels”} (Inglis 1854 pp 60).

\textsuperscript{20} Along with 20-year-old wife Mary Jane Milne

\textsuperscript{21} The Church land is currently disputed by the chiefs of Taloa and Unakap
6.5.3 Blackbirding

The labour trade, or “blackbirding” began in earnest 1863 when the Don Juan sailed to Vanuatu to recruit labour for Australia’s sugar and cotton plantations (Scarr & Davidson 1970pp 225). From that date until 1904, the Melanesian islands provided up to 62,000 workers to Queensland’s plantations. While 30,400 were officially registered from Vanuatu (Mortensen 2000) the total may have been closer to 40,000 (Hayes 2001 pp 11; Siegel 1998). In 1867 alone, over eighteen trading vessels visited the island of Efate to recruit labor (Parnaby 1972). North Efate labour trading was in its heyday between 1868 and 1880. During that time a major labour trading station was operating in Undine bay adjacent to Nguna and Pele (Bonnemaison & Penot-Demetry 1994 pp 45; Giles & Scarr 1968 pp 50). The trade was so pervasive that on his arrival to Nguna in 1870, Peter Milne observed

“all the men in this village have been away at Sydney, Brisbane and other places working for the white men...and all can speak a little broken-English” (Don 1977pp 84).

While it may be a slight exaggeration to suggest that that all Ngunese men had been overseas, within the first 12 months of Milne’s tenure on Nguna, he records the landings of ten labour-recruiting vessels (Don 1977pp 92). The North Efate area was well known as a popular recruiting ground, with ships often passing between the islands of Kakula and Pele to look for laborers along North Efate’s coast (Wawn 1893 pp 126). Other trader diary entries confirm that on Efate Island:

“fully one half of the men belonging to tribes residing within three miles of the coasts have fulfilled a term of service in one or other of our colonies” (Wawn 1893 pp 41). And that Efate men “have been in Queensland before. In fact it is not a month since they returned from there and are anxious to get back again as soon as possible” (Farquhar 1980pp 23). In his opinion, working in the Queensland sugar fields must have been “agreeable kind of slavery afterall” (Farquhar 1980pp 23).

Figure 29 Blackbirders at work on Malekula Island in 1890 from (Bonnemaison 1996) page 187 and on Santo in (Scarr & Davidson 1970)
With such a significant proportion of the population involved in the Queensland sugar cane labor trade, it is feasible to assume that there were important sociocultural impacts. Far from the ‘agreeable slavery’ proposed by Farquhar, most accounts classify the blackbirding era in Vanuatu as one of the blackest in its history. Labour traders were often considered inhumane “man-stealers” (Hunt 2007), and eventually the atrocities committed by them aboard the ships (Saunders 1979) and on the Queensland plantations were brought to light and condemned by the Australian legal system (Corris 1973; Mortensen 2000). Because no ni-Vanuatu writings exist from the period, the impact of the experience can only be surmised by witnesses and assumptions.

The labour trade was particularly loathsome to Rev Milne of Nguna, and throughout his diaries he recalls the “stealing of natives” on Nguna and Pele by labour ships. It was likely under Milne’s direction that one of the trading vessels came under attack off Nguna in February of 1871. First mate Bartlett and several of his crew were killed as they escorted two female ‘recruits’ to the ship (Docker 1970 pp 70). In an affidavit over the massacre, fellow missionaries Paton and Inglis wrote:

“But with such fearful effects, and these of such frequent occurrence, it is certainly high time that the British Government should step in and inquire — and that thoroughly into the causes of these effects ; and if this traffic in labour, as it is called, cannot be carried on — as we feel certain it never will be— without more or less of these fearful results to those engaged in it, as well as its ruinous effects to the natives, by all means let it be wholly interdicted. The trade has nearly exhausted itself in the New Hebrides, and is now extending itself to the Solomon group. Most devoutly do we pray with the psalmist, "Oh, let the wickedness of the wicked come to an end; but establish the just !””

(Steel 1880 pp 249)

There were material impacts associated with the labour trade as well, particularly the introduction of alcohol and tobacco. Erskine noted that smoking was introduced to the island of Erromango only a year or so before he traveled there (Erskine 1853pp 312). The presence of
tobacco and alcohol was widespread on Nguna by the late 18th century. Reverend Milne noted that in Tikilasoa village, there was not to be found a

“a man, nor a boy, who does not smoke constantly” (Don 1977pp 84).

But could there have been any benefits at all to ni-Vanuatu laborers? One direct outcome was the widespread uptake and stabilization of Melanesian Pidgin language. Keesing argues that by the 1860’s the Bislama language was

“quite grammatically developed” with “a substantial number of Islanders learning this pidgin as fluent childhood speakers” (Keesing 1988 pp 14,25).

Before the time of the labour trade, as we have seen, the linguistic diversity in the country would have made inter-island communication very difficult. Speaking Bislama, ni-Vanuatu would have begun to have the chance to share and exchange ideas from other groups more easily. Spending years in Queensland in mixed-island groups may have for the first time enabled members from isolated groups to hear about, copy and adapt marine use and management ideas that would later be brought back to Vanuatu.

Travel for labour was not always overseas. There was a large domestic demand on foreign-owned plantations within the archipelago. By 1894, there were over thirty European plantations on Efate, all requiring substantial labour (Bonnemaison & Penot-Demetry 1994 pp 49). One coffee plantation was located directly across from Nguna island at Undine Bay Efate (Scarr 1967 pp 181). In the period from 1908-1941, over 54,000 people moved from their home islands to Efate and Santo to fully participate in colonial plantations (Jolly 2000; Siegel 1998). By the early 20th century, Speiser remarks that the people and culture of Efate had been irrevocably influenced by the plantation workers brought from other islands (Speiser & Stephenson 1990 pp 56). Could that influence have been positive? Perhaps including the importation of marine use knowledge? Inter-island mixing that occurred on Efate at that time facilitated unprecedented cultural sharing and learning, potentially bringing non-local marine management ideas to Efate, Nguna and Pele.

Figure 31 European plantation owner Robert Glissan at his Efate residence in the 1880s (visible over the water from Nguna and Pele) (Scarr & Davidson 1970) and (Giles & Scarr 1968)

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Bislama comes from the Portuguese “bico do mar” (Thomas) meaning sea cucumber, and likely called thus due to the original trade in trepang from Vanuatu destined for Asian markets.
Wawn, the prominent labour trader, also believed there were benefits to ni-Vanuatu related to the overseas travel. In his view, after three years on the plantations, the returned laborer

“is still a young man, in the prime of his life, strengthened and set up by his late labour, possessed of knowledge and experience of the world which has raised him above his stay-at-home fellows.” And that the trade therefore “works as much for their benefit as ours” (Wawn 1893 pp 17)

He also believed that many villagers wanted to leave Vanuatu to get away from the tyranny of the local missionaries. Naumeta was a houseboy who was allegedly mistreated and overworked by the Rev. Milne of Nguna. According to Wawn, Naumata wanted nothing more than to get off the island and away from Milne, and the labour trade provided that opportunity (Wawn 1893 pp 102). Wawn believed that real world experience in Queensland was beneficially enlightening to Naumata and other young islanders, who upon return would be less of a “pliable article” in the hands of the evangelists (Wawn 1893 pp 17). In his view, “the returned islander is a very different personage for the missionary to operate on” (Wawn 1893 pp 18). Like many other labour traders of the time, Wawn found the missionaries especially difficult to deal with, describing his impression that

“these holy men – of the Presbyterian denomination especially – are rather disposed to exaggerate, to use a mild term, when recounting the details of incidents” (Wawn 1893 pp 102)

6.5.4 Depopulation

A significant impact of the labour trade on the ni-Vanuatu way of life was depopulation. The physical removal of ni-Vanuatu men, and subsequent drop in fertility rates likely contributed to island population declines (Bayliss-Smith 2006). Indirect consequences of the labour trade were much more severe: the introduction and spread of disease for which local people had little immunity. Ivens (1930) suggests that three main phases characterized the depopulation of Melanesia: 1) blackbirders physically removing people from the islands from the 1860s-1890s; 2) the increase in mortal tribal warfare with imported guns from the 1870’s-1890s; and 3) a period of severe disease and epidemic from the 1880s-1920s. In Vanuatu, the third stage would prove to be a mortal blow to island society. Measles, cholera and dysentery were rampant throughout the islands in the 19th century (Bayliss-Smith 2006 pp 21). However at the time, witnesses considered the rapidly declining populations a mystery. Reverend Mackenzie, in a letter dated 1879 from Efate Island, wrote

“It is very sad to see how the natives are dying off at this village. I cannot account for it” (Miller 1978 vol.1987 pp 8).

Neither Nguna, Pele, nor North Efate escaped the fatal epidemics gripping the islands. Visiting North Efate in 1845, Turner noticed that there were many old people about, and was told that men there lived “until the beards of their sons turned gray” (Turner 1861 pp 394)23. Longevity

23 In 1845, Turner estimated that the population of Efate island including North Efate was approximately 12,000 people (1861 pp 393).

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of that kind was not to last. When the Reverend Peter Milne arrived on Nguna in 1870, his seven island district (including Nguna, Pele, North Efate and other offshore islands) had a combined population of 4,000 people (Don 1977). By 1884, Milne’s district population had declined to roughly 3,000 (pp 11)\textsuperscript{24}. In 1908 the district population had reached a low of 1,361 people (Don pp 264) representing a 66% decline in the span of less than 50 years. In describing the experience, Milne wrote that

“there was a great mortality of both church members and children throughout the whole of the district which considerably reduced the population…the number who died of consumption was greater than usual; some died also of dysentery; but the greatest number died of influenza and pneumonia. Many children and several old people died of whooping cough. There was also an epidemic of measles which took its toll. From these causes, the population of most places became reduced…” (Don 1977 pp 256).

The likely trauma to ni-Vanuatu lifestyle is even more pronounced when one considers the impact on each individual island. The population of Emao Island, immediately adjacent to Nguna and Pele, was reduced from 500 people in 1884 to 242 in 1917 (Guiart 1964 pp 105). The population trends on Nguna Island were more severe; in 1870 Milne recorded 1200 people residing in eighteen villages (Don 1977). By 1875 however, Nguna had only 500 residents (Goodenough 1876 pp 350). In 1908 the population on Nguna was 503 people (Don 1977 pp 264). These reduced population levels remained constant for the next 50 years or so, because in 1951 Guiart (1964) estimated the population on Nguna to be 694. In 1966, the Australian Government officially estimated the Nguna population to be just under 800 (Schütz 1969a pp 6). Nguna’s population has since recovered slightly from the lowest levels in the 1870’s; the most current census estimating the islands population at 954 people (Bakeo et al. 2000). But the island has not fully recovered its highest levels. In summary, from 1870 to 1908 Nguna Island lost 58% and Pele lost 47% of the population.

The extent of the depopulation in Vanuatu is almost incomprehensible. One estimate puts the population of Vanuatu at over 1,000,000 people immediately precontact, reduced to 600,000 in 1852 and down to an astoundingly low 45,000 in 1935 (Harrison 1937 pp 261). One can only imagine the social consequences in the face of such momentous loss of life. Realistically there would be ecological consequences as well, primarily due to the reduced pressure on nearshore marine resources. Even if subsistence use was light on Nguna and Pele, the loss of half the population would certainly reduce marine resource use. In our attempt to examine the historical drivers of contemporary marine management on North Efate, we must consider that cultural processes and institutions were likely lost or fundamentally altered during this time of widespread human depletion. Strict rules and norms on marine use and management would be nearly impossible to maintain in a situation where human mortality rates are over fifty percent, as they were on Nguna and Pele. Certainly there would be more pressing concerns and institutional arrangements.

\textsuperscript{24} Steel however estimates that the district population in 1880 was approximately 1000 people (Steel, 1880 pp 242), considerably less than Milne’s estimates.
6.5.5 The cultural taboos of the missionaries

There is little doubt that during this period, Melanesian society was “in a state of deep trauma” (Bonnemaison & Penot-Demetry 1994 pp 50). But in many ways, change had just begun for the ni-Vanuatu people. Depending on the informant, the next period in the islands’ history is thought to have brought either eternal salvation or damnation. From the late 19th century, the next 50 years were to be dominated by the Christian missionaries. But who were these men and women that so changed the ni-Vanuatu way of life? Bonnemainson contends that

“most of these missionaries, of middle-class or modest origin, were from small towns in Scotland...These men were courageous and sincere, but with little schooling beyond their theological studies. They were often narrow-minded and enclosed their missions within the inflexible limits which they had imposed upon themselves. Further, their sectarian views meant that they were not inclined to take tolerant views of the society and the culture they would find” (Bonnemaison & Penot-Demetry 1994 pp 53).

This description well suits Reverend Peter Milne, the Presbyterian missionary who arrived on Nguna and Pele in 1870. Not boding well for cultural survival of the already vulnerable population on Nguna and Pele, Rev. Milne was described as

“self-righteously puritanical, a fearless, dogged pursuer of heathenism, and an inflexible perfectionist.” (Facey 1981 pp 303)

and

“the strictest of all the Presbyterians. He was against the recruiters and the casual traders, against the settlers at Havannah Hourbour, against the Anglicans in the islands to the north, against even his own younger colleague on Efate mainland” (Docker 1970 pp 74).25

One of Milne’s greatest desires was eradicate what he considered to be savage paganism (Espirat et al. 1973 pp 338; Schütz 1969b pp ix). He sought by any means, along with other missionaries working in the archipelago, to ensure that “heathen join the Christian party” (Miller 1978 pp 250). Collectively, the missionaries liberally adopted the indigenous word

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25 The missionaries who arrived later than Milne, often from different denominations and with more education, had more liberal and progressive ideas about local culture (Bonnemaison, 1994 pp 61).
‘taboo’ and used it in their teachings and cultural restrictions on local people. The taboos placed by the missionaries ranged from tobacco use (Paton 1894 pp 121) to wearing flowers behind the ears, and included a near complete prohibition of cultural ceremonies (Scarr 1967 pp245).

A drive to physically destroy pagan culture and custom was a widespread cornerstone of the early missionary philosophy. Erasing existing cultural beliefs was a way for missionaries to cement their spiritual authority over local populations. Tippitt found that

“most Missionary churches of Melanesia…were power encounter situations in which the old animistic divinities or their shrines were formally rejected by means of an ocular demonstration. The mode of destruction (skull houses, ceremonial skulls, fetishes, idols, monoliths, sacred groves or taboo totems) was by burning, burial, drowning or devouring.” (Tippett 1987 pp 273)

However, of all the missionaries working near Efate, only Rev. Peter Milne of Nguna made the most “serious efforts to interfere with native custom” (Guiart 1964 pp 98). In Milne’s own words, he describes his war on the indigenous lifestyle:

“I forbade the betrothing of children when young; the selling of their girls to husbands; the making of feasts at funerals; the putting of superfluous calico and other things into the grave…the making of a feast at the birth of a child…I spoke about kava, grog and tobacco” (Miller 1978 vol 1986 pp 159).

He lamented that congregation continued to engage in cultural norms, for example taking

“a cargo of pigs to sell to the heathen who want them for…natemate (death rituals)” (Don 1977 pp 281)

and participating in group

“singsings…which are regarded by us…as the backbone of heathenism.” (Don 1977 pp 74).

Figure 33 Pig killing ceremony on Tanna Island in 1975 (Hermann & Bonnemaison) and a pig killed on Nguna in 2007 in preparation for a village celebration.
Milne needed the support of local chiefs and leaders to spread his message, but was simultaneously desirous of eliminating their control over local people. As a means to minimize their customary authority, he was particularly insistent on replacing the system of matrilineal chiefly inheritance with a more familiar progenetorial system (Espirat et al. 1973 pp 338; Schütz 1969b pp ix). Before Milne arrived, chiefly titles and dowry land were inherited maternally26 (Guiart 1964 pp 102). Figure 45 demonstrates the system of chiefly inheritance on Nguna and Pele before Milne’s arrival. In this system, females pass the chiefly title to the next generation, and in the case of their husband’s death, hold the title until the children are ordained (Ray 1887 pp 410; Schütz 1969b pp 249).

There is anecdotal evidence that, in terms of the ordination of paramount chiefs there was some democratic choice in pre-contact times. The word *pusumaki* in the Nakanamanga language literally means, to “discuss the selection of the chief at length” (Schütz 1969b pp 250-251). In ideal situations, the chieftainship would pass from chief to maternal nephew (Espirat et al. 1973 pp 274), but this was not always the case. In cases of many nephews, it is possible that the most revered would be selected (Facey 1981 pp 307). That is to say, chiefly titles, although maintained in matrilineal clan lines, would be bestowed in a discretionary manner on individuals who demonstrated the requisite governance characteristics (Facey 1981 pp 299). In the case of “weakness or unpopularity, the hereditary claimant was rejected in favor of another” (Don 1977 pp 20). Reverend Peter Milne’s introduced first-born-son doctrine led to the creation of linear royal families more akin to the European aristocracy Figure 46. He created a system which unnaturally amassed power in particular families in order to be able to focus on converting them without worrying about their dethronement by popular democracy.

Pre-contact weddings would almost always be between a local man and a woman from another island. One of the principal benefits of this practice was its ability to connect people from across the archipelago and ensure permanent security and hospitality when traveling (Espirat et al. 1973 pp 275). The intentional function of maternally-inherited totemic systems (known on Nguna and Pele as namatarao) was to provide a safety net for any person on any island in the archipelago (Guiart 1964 pp 74), as any given village would have members of many totems (Guiart 1964 pp 100). Milne’s progenitorial system of inheritance facilitated the formation of self enclosed groups or kingdoms, culturally cut off from neighboring villages and islands. This

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26 Although land stewardship responsibilities were often passed from father to son on Nguna and (a practice known as namavisi)
social exclusion practices may partially account for the intensity and longevity of modern disputes between communities. While the pre-Milne clan namatarao still exist, they have become significantly less important to social organization.

Land tenure was also severely impacted by Milne’s forced disengagement from the matrilineal system. Before Milne’s arrival, land was inherited from the father, but also from the mother (from others islands). Thus children would be culturally obliged to retain contact with and travel beyond their home community and island. In the case of land shortage in one village, islanders had land in others (Espirat et al. 1973 pp 275; Guiart 1964 pp 100). Today however, the land stewarded by the father’s family must be divided and redivided with each subsequent generation. Families on Nguna and Pele strongly feel land availability pressures; there is simply not enough to be equitably shared among offspring. With the loss of the matrilineal land tenure system, there is no longer a mechanism for inter-community and inter-island land redistribution.

Problems related to Milne’s changes to political and social hierarchy are surfacing in contemporary times. In one community on Nguna, the only son of the paramount chief has, throughout his life, proven himself generally unfit to lead the community. Though his father still holds the title, there is some discussion about reinstating the practice of electing the paramount chief rather than allow the office to be desecrated by an unworthy individual.

6.5.6 Language homogenization

Today the residents of Nguna and Pele all speak the Nakanamanga language, though as previously mentioned, many believe that there were once up to 12 separate dialects on Nguna. Peter Milne adopted the language he first encountered in Taloa on Nguna and began, for the first time, to codify, record, and disseminate it. During his lifetime he translated and published the entirety of the Old and New Testaments in Nakanamanga (Tusi Tapu). He also translated and published the Presbyterian Hymnal (Nalengaana maga ni Nalotuana) (Miller 1978 bk 5 pp 150). In all there may be as many as 40 works attributed to Peter Milne in the Nakanamanga language. While his dedication to these language projects shows that he valued local language for the spread of Christianity, there exists the strong possibility that he and other missionaries facilitated a homogenization of indigenous languages in central Vanuatu (Thieberger & Ballard 2008).
6.5.7 Physical displacement and a new marine identity

Social and cultural changes due to missionary influence, while severe, are often difficult to quantify. However the physical displacement of island communities is a prominent example of the profound changes wrought on ni-Vanuatu communities during this period. Housing and village settlement patterns in Vanuatu have been unceasingly adapted since European contact (Rodman 1985a; Rodman 1985b), often through physical displacement. Guiart credits the modern village on North Efate to the conscious intervention of the early missionaries (Guiart 1964 pp 99-100), arguing that the missions preferred settlements in lieu of the more common precontact aggregation of households around men’s clubhouses. According to some, physical displacement was implemented by the missionaries to amass power, obtained via

“The colonial practices of forcing inland populations to move down to coastal areas where they could be more easily controlled and amalgamating small hamlet groups into larger villages” (Spriggs 1997 pp 263)

Physically moving villages is a socially traumatic exercise in its own right. However moving upland communities down to coastal areas brings about special identity issues in Vanuatu. Here, as in much of island Melanesia, there exists a bush-sea dichotomy among communities (Roe 2000). Bush villages are stereotypically associated with agricultural production systems while sea villages are associated with fishing and reef scavenging. Via regular trade and barter, each group was able to obtain necessary resources, while specializing in the production and refinement of locally available products. Each group, the bush people and sea people, developed geographically-specific production and resource enhancement practices, able to provide “specialist services” (Roe 2000). Moving created a cultural vacuum. Connections with sacred places, dancing areas and stones were forgotten. The skills associated with place-based resource husbandry were lost or made irrelevant. Bush people were forced to begin using sea resources, ecosystems about which they previously may have had little practical knowledge. Roe confirms the disparity in expert local knowledge by acknowledging that

“not only the resources themselves, but also the knowledge of them are similarly assigned to different communities”. (2000)

Critically the mass amalgamations to large coastal settlements have increased human pressure on sea resources. Father Walter Lini laments the

“general movement of people away from the interior or ‘bush’ to the coastal plains and this has led to pressure on land” (Lini 1980pp 44).

Displacement brought people to land that they previously had little customary right to use or husband, leading to much current confusion over land ownership. Contemporary oral histories suggest that few villages on North Efate were located directly on the sea shore. In fact, many residents can easily still identify the location of the previous “suman-tava” (hill house) settlement sites. Mass displacements can largely be attributed to Reverend Peter Milne who often told locals that moves were necessary to distance people from the epicenters of disease outbreaks. Regardless of the cause for the moves, Miller writes that
“In the closing years of the 1890’s bush villages on Nguna ceased to exist. The remnants of bush villages appear to have merged with the coastal villages which were under Missionary supervision” (1978 pp 113).

Not all communities on Nguna and Pele were in fact moved, and several villages are still considered ‘bush’. In general, the bush-sea divisions “are sometimes somewhat fluid” (Roe 2000), as residents in bush villages would have had some interaction with the sea. In practice, no contemporary bush village on Nguna is more than an hour’s hike to the coast. However, the number of ‘new’ coastal communities is of particular interest to the analysis of historical marine resource use. Culture and custom emerging from the post-contact period would, in theory, be most related to ‘bush village’ economic modes of production. Based on this argument, little collective indigenous knowledge about marine stewardship should exist in most North Efate communities. David, writing about contemporary fishing in general notes that

“The burden of history still plays a significant role in the importance of fishing among village activities. Many of the present residents of the foreshore areas came originally from inland villages which they abandoned in the first half of the 20th century, or later still, in order to congregate around the missions, which were all located in the waterfront. Faced with a totally alien environment (the sea) these bush people had to invent, in the space of a few decades, a whole new culture adapted for this environment. Very often, the new lore was developed in relationship to the old land oriented knowledge and is fragmentary at best” (David 1994)

In the context of these often permanent physical relocations, it would be exceedingly difficult for a ni-Vanuatu community to actively maintain any preexisting marine management practices. Recent village displacements also likely intensified the pressure on localized marine resources, particularly on the coastal areas of Efate and its offshore islands. In general, it is instructive to recognize that the ni-Vanuatu relationship with the sea and its resources has undergone fundamental changes since the time of European contact. Accepting that geographical displacement (and associated social change) is a historical reality which refocuses and strengthens our analyses of contemporary marine identity and practices on Nguna and Pele.

6.6 Ancient customary taboos; drawing conclusions

Recent ethnographic and observational evidence, while patchy and often anecdotal, does suggest that resource prohibitions were used in Melanesia before European contact, but most commonly as a form of social restriction employed to cement the authority of village leaders. What Cook first observed as the taboo in Polynesia may have only reached archipelagos like Vanuatu in the last 200-300 years, introduced and popularized by early traders, missionaries and other visitors. Missionaries in particular were quick to use the term taboo widely to impose their will on indigenous congregations. Contemporary authors emphasize the ecological benefits of the taboo, though very few early observations support that these were the intentions of indigenous residents. The first suggestion that taboos were used to prohibit the use of sea resources only occurred in the mid 19th century, well after Europeans had been actively promoting and writing about the term in Europe and throughout the islands.
In Vanuatu, the earliest descriptions of the taboo institution depicted a system of social prohibitions, through some later observations note they were used to restrict the use of fruit and nuts. By and large these restrictions seemed to be utilitarian rather than conservationist; that is, resources were taboo until such time as they could be most effectively harvested or consumed. There is little direct evidence that taboos were frequently declared over sea resources in Vanuatu. Of the scant evidence for this practice, observations suggest that marine taboos were evoked to restrict access by outsiders rather than actively manage stocks. The lack of marine management regimes over the last several centuries substantiates many early observations in Vanuatu were poor seamen in comparison to the archipelagos to the East. There were exceptions to the rule, for example Futuna Island in southern Vanuatu, which was observed to have a keenly developed maritime tradition.

As for Nguna and Pele, there is no evidence that marine taboos were employed at all. Despite thousands of pages of detailed descriptions by the first missionary of other cultural practices, marine taboos are not mentioned. Neither do surviving custom stories from Nguna and Pele include references to marine management. Rather, these stories tend to demonstrate only a basic level of maritime knowledge or skills. It is an unresolved mystery regarding why these islands did not appear to have developed a strong maritime culture despite the large area of available reef and sea grass flats nearby.

There is substantial evidence that the islands of Vanuatu were culturally isolated from one another, potentially limiting the spread of marine management regimes that may have been developed elsewhere. Soon after Lapita settlement, island populations became more settled and inward looking. Each group developed specialist services which could be bartered with neighbors, but in a way so as to maintain some linguistic and cultural unintelligibility. More than one hundred distinct languages evolved and cultural boundaries were strengthened. While the people of Nguna and Pele islands likely traded with their neighbors, they probably did so infrequently. The islands of Nguna and Pele certainly did not represent a homogenous cultural unit when Europeans first visited. Up to 12 languages are alleged to have been spoken on an island just a few kilometers across. Obviously, in such a fragmented society it is possible that if marine management taboos had been developed on one island or one village, they might never reach others. Warfare seems to have been the driver of cultural isolation. It was particularly intense on Nguna just prior to European contact, when settlements contracted into themselves for protection from neighboring groups. Reef use and management would have been an extremely hazardous activity on Nguna, exposing users to attack. Ongoing warfare convincingly explains why marine management was not practiced on Nguna and Pele, at least over the last several centuries.

Pre-contact cultural practices that were maintained through indeterminate periods of warfare in Vanuatu would soon be subjected to a greater threat: European culture contact. Exposed to new ideologies from the beche-de-mer and sandalwood traders, colonial explorers and missionaries, pre-contact customary and traditional practices were especially targeted for eradication. The labour trade physically removed entire generations of potential fishermen, often never returning them or their knowledge of marine resources. Back in the islands, the missionaries were actively seeking to eradicate the “paganism of the savages”. Disease and depopulation were
resolutely aiding these goals. Everything about the island way of life was undergoing change, from the language to the ownership of land and sea resources. Human settlements which were most commonly located in the bush were dismantled in favor of mega-villages by the sea. Thousands of island people with little coastal experience now had to create a new maritime identity for themselves.

Thus it is clear that for centuries, ni-Vanuatu communities have employed the prohibitive institution called taboo over areas, dwellings, substances, food, trees, the sea and the coast. However, there is no evidence to suggest that taboos in Vanuatu were established for conservation purposes or to prevent long-term resource overexploitation. Rather, the motivation for establishing taboos in Vanuatu can be categorized as follows: 1) the avoidance of some undesirable behavior/activity; 2) the reverence of a sacred place; or 3) a temporary means to stockpile resources for more efficient use at a later date. One of the leading advocates of the ancient marine conservation paradigm has recently acceded that the taboo of the past may not have been established for conservation purposes:

"many taboos imposed today, however, are more contemporary expressions of earlier ones that have integrated modern ideas and concerns” (Hickey 2006 pp 20).

6.7 Marine Protected Areas: customary management?

Ambitious calls have been made to establish marine protected areas (Wood et al. 2008), (Mora et al. 2006) and reserve networks (Hughes et al. 2005) in order to meet global biodiversity targets (Brooks et al. 2006). According to scientific consensus (Gaines et al. 2001), a marine protected area (MPA) is “an area designated to enhance the conservation of marine resources” while a marine reserve is “an area of the sea completely protected from all extractive activities”. These definitions include areas large and small, and areas designated by national governments and private individuals. In much of the developing world, communities also establish MPAs.

The number of community-established protected areas is increasing at an unprecedented rate (Chape et al. 2008) and there are calls to further recognize and facilitate these local-level initiatives as part of multi-scale responses to a changing world (Berkes 2007a; Berkes 2009). The Pacific Islands region has been identified as a major priority for new protected area expansion (Rodrigues et al. 2004), which is already experiencing a renaissance of locally-based marine management initiatives (Johannes 2002b). Closures defined and managed by island communities, often called community conserved areas, are being promoted as a sustainable and locally appropriate management option (Berkes 2008). While the region’s rich heritage of marine use and management has long been recognized (Hviding 1996; Johannes 1978), the scale of the contemporary reserve implementation phenomenon in Pacific Island communities is historically unprecedented.
6.7.1 Recent history of protected area establishment

Today, community-based closures abound in Vanuatu. Most closures are specifically established for resource-enhancement and conservation, though spiritual and ceremonial closures also exist (Regenvanu 1997). In the early 1990’s, the Vanuatu Environment Unit launched a program to establish community-based forest conservation areas (Techera 2005). As a result, the Vatthe Conservation Area was established in 1994 on the island of Espiritu Santo over 3,700 sparsely populated hectares of alluvial forest (Read 2002). Co-implemented by the Vanuatu Environment Unit and local communities, Vatthe was promoted as a demonstration project for the nation. It was this project that enabled the phrase ‘conservation area’ to become widely recognized. In 1995, the Vanuatu Forestry Department, in consultation with communities on Erromango Island, established the 3,200 hectare Kauri Protected Area (Tacconi 2000).

Several individually-owned or private closures also were established in the 1990s. In 1991, with support from the Fisheries Department, a 100-hectare coral reef closure was established by a family group in the Maskelyne islands. The small, permanently closed area has been known variously as a sanctuary, marine conservation reserve, and ringi te suh, which in the vernacular language means ‘to allow to multiply and to leave something alone’ (Masang 2000). Also in 1991, the Uri community on Malekula Island established the 25-hectare conservation-focused Narong Marine Park (Tari 2002). The Loru Rainforest Protected Area was established in 1995 on Santo Island as a 220-hectare privately owned permanent forest closure with the assistance of an NGO called the Vanuatu Protected Areas Initiative (VPAI) (Hills 2008).

Community establishment of protected areas took hold in earnest in 1995 through the work of the Wan Smolbag (WSB) Theatre Company. In response to the South Pacific Regional Environment Program’s (SPREP) Year of the Turtle, WSB produced an educational play entitled ‘I’m a Turtle.’ Presented to villages across the island of Efate, it sought to create sense of empathy and responsibility for the protection of sea turtles (Petro et al. 2007). One of the first practical outcomes of WSB’s turtle play was a ten-year ban on turtle harvesting, enacted by the chiefs of Nguna and Pele islands. A network of villagers, initially called Turtle Monitors, was established to directly link community representatives to WSB. Now known as the Vanua-Tai network, this organization serves as a major conduit of conservation information and discourse to remote communities. Community-established conservation areas associated with Vanua-Tai members are now thought to number over two hundred and thirty throughout the archipelago.

Johannes (1998b) documents a case of community-initiated conservation closures resulting from a trochus awareness program on North Efate in the 1990’s. Encouraged by a government Fisheries extension officer, villages began to establish three-year marine closures for the explicit purpose of trochus management. Expanding to include other important organisms like fish, beche-de-mer, and giant clams, these closures soon spread to surrounding villages. A follow-up survey in 2001 found that the number of village conservation measures had doubled (Hickey & Johannes 2002). This number included a never-before-recorded type of marine closure in Vanuatu: the marine protected area, or MPA.
MPA has now become the management regime of choice on Efate and the small satellite islands of Nguna, Pele and Emao. From 1998-2008, eighteen new small-scale MPA and taboo closures were established by communities on these three islands, initially with the support of US Peace Corps volunteers. These communities are part of the Nguna-Pele Marine Protected Area Network. Communities on the nearby islands of Lelepa and Moso also have declared marine protected areas with the encouragement of the Vanuatu Cultural Center and Fisheries Department (Tarisesei & Novaczek 2005).

The protected area phenomenon has now expanded to other parts of the archipelago. As part of the Global Environment Fund’s International Waters Project (IWP), the national government assisted a struggling network of chiefly taboos on Malekula Island to establish the Amal Bay closure, known variously as a taboo area (IWP 2006), community conserved area (James 2006) and marine protected area (Vanuatu Environment Unit 2007). In 2005, the local NGO Wan Tok Environment Center (WTEC) began helping communities to establish marine protected areas and forest conservation areas on the islands of Santo and Malekula. Communities working with FSP Vanuatu, another local NGO, also have established taboo areas and marine protected areas. Recently, a group of communities and chiefs working in partnership with the national government created the Efate Reserve Park in interior Efate (now known as the Efate Land Management Area), which covers more than twenty percent of the island’s surface area. Ultimately, the recent push by local communities to establish taboos and marine protected areas likely far outstrips any previous regime of marine resource management in the history of the islands. Historically traditional or not, the contemporary MPAs are very much a part of today’s ni-Vanuatu culture, potentially serving both social and ecological needs.

6.8 Summary & Conclusions

Following on the previous Chapters, this Chapter delves further into the widely-held belief that ancient Vanuatu inhabitants had developed complex and sustainable systems of marine resource management. The Chapter examines the conceptualization of the “taboo” by contemporary anthropologists, historians, early missionaries and early Pacific peoples, and poses questions on the original intent of taboos and their efficacy for natural resource sustainability. The early part of the Chapter concludes that the ancient taboo was most likely a form of social institution which concentrated and maintained power for the leadership over the masses.

The Chapter then reviews the evidence for marine resource taboos on Nguna and Pele, drawing heavily from the over 12,000 pages of diaries left by the late Rev. Peter Milne. He and more recent missionaries of the 19th century suggest that marine closures did not form a part of the post-contact culture on Nguna and Pele Islands. Thus the existence of dozens of community closures in the area today is a very recent phenomenon.

To understand why these management regimes were not a part of life on Nguna and Pele over the last several hundred years, the Chapter examines potentially limiting factors, such as cultural isolation among the islands (geographical, linguistic, sea/bush divides etc), warfare (and the impossibility of controlling extra and intra village affairs), and the major upheavals brought by European contact (blackbirding, trade in trochus and beche-de-mer, disease and depopulation,
the cultural taboos of the missionaries, changes to chiefly heredity, language homogenization and physical displacement).

The Chapter concludes with a description of the current state of marine closure establishment throughout the archipelago. Community conservation areas, including MPAs and taboos, represent an increasingly popular approach to managing biodiversity around the world (Berkes 2009), and have proved extremely popular in Vanuatu over the last two decades. Communities in Vanuatu enjoy legislative support for marine protected areas and taboos, and although financial support is often lacking, MPAs continue to flourish because the costs to implement, maintain and enforce coral reef closures are shouldered by individual villages. The following chapter will focus on the political nature of marine management in order to understand the current broad-scale centralized support for MPAs in Vanuatu.