Non-compliance with management rules and its implications for traditional inshore fisheries in Fiji

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EBM FIJI ISLANDS

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Cover photo © 2009 Heidi Williams: Boat donated by Partners in Community Development Fiji (PCDF) to the communities of Kubulau to help them monitor their *qoliqoli* for enforcement.

EXECUTIVE SUMMARY

Research for this study was carried out under a two-year project to support the implementation of Ecosystem-Based Management (EBM) at two catchment-to-reef sites on Vanua Levu, Fiji. While the original scope of the study was to draw on lessons from community monitoring of infringements within their marine protected area (MPA) networks, efforts to assist communities to keep regular records of non-compliance met with numerous challenges. Because of the limited community monitoring data, the report has changed in scope to discuss some of the root causes of non-compliance with fisheries regulations within the traditional fishing grounds (*qoliqoli*) of Kubulau District and Macuata Province. To do this we address four main aims:

1. Document potential public awareness of the issue through the national media;
2. Assess some specific factors influencing non-compliance in Kubulau District, Vanua Levu;
3. Describe the biological consequences of intensive exploitation during a single harvest event in a case study from Macuata Province, Vanua Levu; and
4. Provide recommendations for legal and institutional reform to improve compliance.

In addition, we discuss how many of the causes of conflict which result in non-compliance may be traced to discord between customary management rules and national legislation. Much of this text is drawn from a paper conditionally accepted for publication in a special themed issued on community-based management in Environmental Conservation[1].

The frequency of reports about non-compliance with fisheries regulations appears to have increased since 2006 (1 article in 2006 versus > 10 in 2009), as there has been more vocal public discussion of the need for reform of fisheries legislation. Recurrent topics have included: poaching; inadequate powers of fish wardens; and the arrest of the high chief of Macuata (Tui Macuata) for larceny after seizing a boat and catch of suspected poachers.

Using Kubulau District as a case study on the root causes of internal fisheries offences, close examination of socioeconomic data reveals several factors which appear to influence differing levels of internal compliance among villages and individuals within villages. These include: awareness of MPA rules; communication of MPA boundaries; respect for traditional authority; and perceived inequity of costs associated with no-take closures. Recommendations to improve local compliance include: awareness programs targeted to specific knowledge gaps in each village; conflict resolution exercises; and potential compromises with management rules or boundaries in order to reduce the cost-burden of fishers who perceive inequity.

Cakaulevu tabu in Macuata qoliqoli was used as a case study on the biological consequences of intensive pulsed fishing, even though the harvest was a sanctioned event by the communities and the Tui Macuata. The results of this study demonstrate that intensive fishing over a short period (four weeks) can remove all positive effects of protection in formerly no-take tabu areas.

[1] Clarke P, Jupiter SD (accepted) Law, custom and community-based natural resource management in Kubulau District, Republic of Fiji Islands. Environmental Conservation

The main effect of the harvest event was seen in primary target fish, which suggests that fishing was the main cause of the dramatic reduction in biomass observed in the protected area. Based on these assessments, we recommend that locally managed marine areas (LMMAs) maintain at least some permanent no take areas as part of a network to prevent possible recruitment failure or overexploitation of fisheries resources.

Legal recognition of traditional resource tenure and decision-making processes is a key factor in the effectiveness of community-based natural resource management to improve fisheries compliance at the national and regional level. Within the legal systems, community-based managers need secure and well-defined rights, as well as the flexibility and power ('legal space') to make decisions that reflect their unique circumstances and priorities and to be able to issue sanctions for infringements that bear weight with offenders. Legal and institutional reform in the Fiji fisheries sector should include: improved training and resources for community fish wardens; fisheries enforcement training for police and magistrates; increased penalties for offences under the Fisheries Act; powers for the Department of Fisheries to revoke fishing licences for breaches of the Fisheries Act; a clear and efficient process for gazetting legally binding restricted areas; and formalised management powers for community resource management committees. Within the existing legal framework, communities can improve marine management outcomes by: protecting *tabu* areas using licence conditions; not renewing licences for vessels that wilfully breach community rules or national laws; increasing fish warden patrols; and, reporting breaches to police, fisheries officers and the Fiji Locally Managed Marine Area (FLMMA) network.

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INTRODUCTION

Compliance with rules and regulations for marine protected areas (MPAs) is highly dependent on the source of the rules, the respect for the decision-making authorities, and the likelihood and penalties for offenses. In Fiji, as elsewhere in the tropical Western Pacific, MPAs exist within a dual system of national legislative frameworks and local customary management rules. While these dual systems are sometimes complementary and promote sustainable fisheries management, they are just as often in conflict. This has fostered a high level of non-compliance and, in some cases, has resulted in exploitation of Fiji's inshore fisheries (IAS 2009). This report examines the characteristics of non-compliance of fisheries regulations in Fiji and attempts to pin-point some of the key factors in order to recommend changes for legal and institutional reform.

Community-based natural resource management (CBNRM) has been a feature of Pacific islands for centuries (Veitayaki 1997). While the effectiveness of these traditional management systems was variable and context dependent, they nonetheless played an important role in maintaining resource availability in many communities throughout the region (Johannes 2002; Aswani 2005). These traditional governance systems were modified and eroded during the colonial era (Johannes 1978; Care and Zorn 2001), and the contemporary legal systems of Pacific island states and territories vary in the extent to which they recognise customary law and traditional resource tenure. Most national constitutions in the region have provisions recognising traditional customary rights, but the extent of this recognition, and the place of custom in the legal hierarchy, varies across countries (NZLC 2006). The Constitution of Tonga (1878), at one end of the spectrum, provides no formal recognition of customary rights. The Constitution of the Republic of Palau (1979), by contrast, strongly protects traditional law, stating that statutes and traditional law are equally authoritative and that statutes must not be inconsistent with the 'underlying principles' of traditional law (Article V, s.2). In Fiji, although the Constitution was abrogated in April 2009, the document had required Parliament to 'make provision for the application of customary laws and for dispute resolution in accordance with traditional Fijian processes' (Constitution Amendment Act 1997, s.186).

In particular, recognition of customary marine tenure has been uneven throughout legislation of Pacific island countries, reflecting a historical conflict between Pacific marine tenure systems and the 'open access' traditions of colonising European states (Govan et al. 2009). In Fiji, the *Fisheries Act [Cap 158]* dating back to 1941 has several provisions that support customary management of marine protected areas within traditional fishing grounds (*qoliqoli*). The Act: provides for national recognition of qoliqoli through the Native Lands and Fisheries Commission; recognizes resource owner's subsistence fishing rights; prohibits fishing for 'trade or business' without a license; empowers the Minister to establish restricted areas and adopt management measures; and empowers the Permanent Secretary to appoint honorary fish wardens (Annex A). However, these legal rights are often undermined by: inadequate license conditions; exemptions for certain fishing methods which prevent full declaration of no-take areas under the law; lack of resourcing for fish wardens; lack of cooperation from the police

and judiciary; and inadequate penalties for infringements (Minter 2008). Furthermore, the Act does not recognise other customary marine tenure rights, including the right to control access to the *qoliqoli* and the right to establish and enforce management measures, including *tabu* areas, which is in direct conflict with the customary resource management traditions for entire ridge-to-reef units (*vanua*).

In practice, traditional governance systems remain the primary mechanism for regulating the use of marine resources in many contemporary Pacific societies (Cinner and McClanahan 2006; Aswani et al. 2007). Respect for customary law and institutions are an integral feature of most rural communities, where the overwhelming majority of disputes are resolved by customary means (NZLC 2006). The imposition of effective sanctions for breaching community rules, however, is considerably constrained by the national legal system. In past centuries, traditional penalties in Fiji and elsewhere in the Pacific included beatings, execution, banishment or seizure and destruction of property (Munro 1996; Tiraa 2006), all of which are prohibited under Fiji's criminal law. Lawful sanctions for breaching community rules, which include verbal warnings, public shaming and withholding letters of consent for fishing license renewal, are largely ineffectual given that the financial benefits of breaching community fishing restrictions are substantial. Resource owners who take the law into their own hands face a real risk of criminal prosecution.

Given police reluctance to investigate fisheries crimes, the rarity of prosecution and the lenient sentencing and low fines (Minter 2008), infringement of fisheries regulations and community management rules is commonplace across Fiji. This report aims to:

1. Document potential public awareness of the issue through the national media;
2. Assess the specific factors influencing non-compliance in Kubulau District, Vanua Levu;
3. Describe the biological consequences of intensive exploitation during a single harvest event in a case study from Macuata Province, Vanua Levu; and
4. Provide recommendations for legal and institutional reform to improve compliance.

MEDIA MONITORING OF INFRINGEMENTS

> *"Journalists play an important role in raising awareness of how the marine environment is being affected by people's actions"* Daryl Tarte, 2007, Fiji Media Council chairman.

Media has always been an effective tool in awareness rising of issues affecting the public. One such issue is the infringement of community-managed marine protected areas (MPAs), locally referred to as *tabu* areas. MPAs are set up to replenish and safe-guard fisheries and biodiversity (Lester et al. 2009), which are globally being depleted due to over harvesting and unsustainable fisheries management (Jackson et al. 2001; Pauly et al. 2005).

In Fiji and around the world, one of the biggest challenges of managing community MPAs is infringements by poachers, in many cases brought on because the socioeconomic context was not adequately considered during the establishment process (McClanahan 1999; Christie et al. 2003; Cinner 2007). However, infringements have received little or no attention in Fiji from police or judiciary because of weaknesses in the fisheries legislation described above. By contrast, public awareness of and discontentment with the issues appear to be growing. One effective means of documenting potential changes in public awareness is by monitoring the frequency with which stories on non-compliance of fisheries regulations are reported in the local media.

Local online media websites that archive printed articles (www.fijitimes.com, www.fijisun.com, and www.dailypost.com) were searched for articles on infringements using the following key words: 1) compliance; 2) poachers; 3) infringement; 4) Marine Protected Areas (MPAs); 5) fish wardens; 6) marine reserves; and 7) tabu areas. The articles retrieved were then tallied and plotted to show changes in the frequency of printed articles between January 2006 and October 2009 (Figure 1).

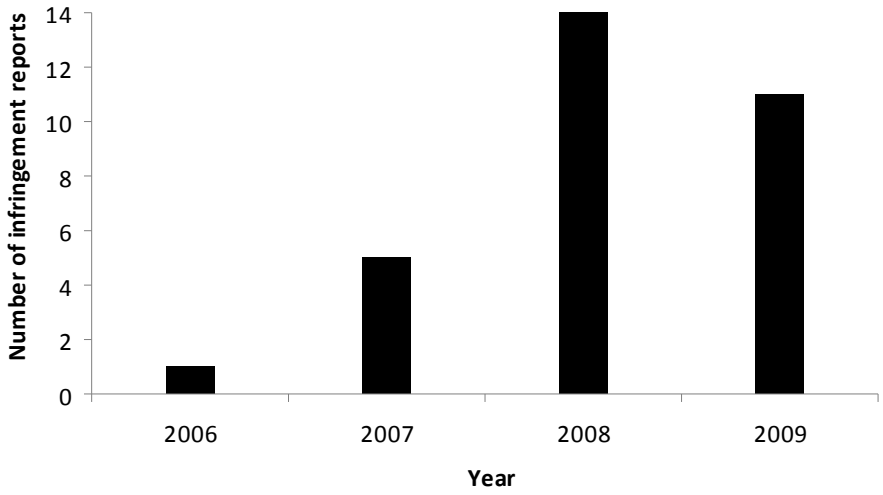

Figure 1. Number of infringement articles appearing in local printed media (Fiji Times, Fiji Sun, and Post Fiji) from January 2005 to October 2009.

Since 2005 there has been numerous articles written on infringement related issues, with a peak in 2008. This peak is in part due to the media frenzy created by the arrest of the high chief of Macuata Province (Tui Macuata): 6 of the 14 articles addressed this topic. In 2008, the Tui Macuata, Ratu Aisea Katonivere, was charged with larceny after seizing a fishing boat and catch from fishers found illegally fishing a tabu area (Fiji Times 2008). The charges against him were subsequently dropped, but the case highlighted the need to ensure that community sanctions do not breach criminal laws, and appear to have had a chilling effect on community-based enforcement.

Infringements reported by fish wardens reveal that both traditional fishing rights owners (TFROs) and those without resource rights are guilty of poaching (Nakeke 2009; Fiji Sun 2009; Kikau 2009). In the case of Navakavu tabu in Rewa Province, the Fiji Sun reported, "nearby villagers are aware of the abundance of fish and invertebrates in the MPAs" and added, "to make the matters worse, most of the poachers are from the four villagers where the MPA have been set up" (Nakeke 2008a). In some cases, poachers work "with people who live in the area and contacts in villages give them information about the best time to fish without being caught" (Kikau 2009).

Fish wardens trained by Fisheries department can help "secure fishing grounds where the illegal fishing is done" (Fiji Sun 2008). However, fish wardens fail to properly execute their roles because of: (1) lack of authority (Rarubalavu 2009, Silatoga 2009); (2) weak fisheries legislation (Nakeke 2008b); and (3) ineffectual penalties for poachers (Govind 2009). Regarding penalties, the Fiji Sun reported, "Fishermen who apply for fishing licenses know that they are not allowed to fish within tabu areas and if they did they would only be fined $300" (Nakeke 2008a), while the Fiji Times wrote "the penalty for fishermen found breaking the law is not strict enough to act as a deterrent" (Fiji Times 2007). In addition, as a result of weak powers granted under the *Fisheries Act*, fish wardens feel that they "watch what is happening and can't do anything because the government has not given them the authority to do anything to these poachers" (Rarubalavu 2009). "It is frustrating to the fish wardens as they catch poachers and bring them to police and Fisheries department, however, lack of action leads the fish wardens to believe that the police and Fisheries department are not clear of their roles" (Nakeke 2008c).

There has been strong public recognition of the need for legal reform. Current fisheries laws were "enacted in 1942 and have outlived most of its mandates thus is in need of a review" (Fiji Times 2007). Mr Epeli Nasome, Director of Fiji Department of Environment, has said that "the *Fisheries Act* may be reviewed to ensure sustainable fishing practices" (Panapasa 2008).

To date, there has been no prosecution of poachers under the current *Fisheries Act*, although some poachers have been prosecuted and fined for other minor offences (Nakeke 2008a). "Fish warden Saimoni Ratukadrau claims he has caught 41 illegal fisherman but to date no one has been punished by either paying a penalty or appearing in court or sent to jail" (Nakeke 2008a). The failure to properly prosecute poachers has lead to an uprising conflict and frustration between community fish wardens, police and fishermen. The lack of awareness of police officers leads to police being accused of "selectively prosecuting fishing ground owners and letting poachers get away with their crimes" (Ralogaivau 2008).

Despite these challenges, there are promising signs that police have taken notice. The January 8, 2010 edition of the Fiji Sun reported a front page headline "Navy net nabs 10 illegal fishermen". The 10 men from Macuata Province caught in the Yasawa Islands after allegedly fishing without a license have been charged by the police and are expected in court (Janine 2010). Furthermore, the Fiji Times recently reported praise to police from the Tui Macuata for their recent efforts to fight illegal fishing (Fiji Times 2010).

FACTORS INFLUENCING NON-COMPLIANCE

Management success within a customary tenure regime is dependent on many factors which include: awareness of and respect for management rules; capacity for monitoring and enforcement; and internal support for management decisions (Aswani 1999; Aswani and Hamilton 2004). We consider some of these factors below from Kubulau based on the results of socioeconomic surveys in Kubulau in order to provide recommendations for future community development work which might improve compliance among residents.

Awareness of management rules

The Kubulau Ecosystem-Based Management plan (WCS 2009) was developed through a participatory planning process to integrate community management rules with national legislation for 'ridge-to-reef' management. The management plan was completed in July 2009, and has been endorsed by the Kubulau high council of chiefs (*Bose Vanua*) and the Kubulau Resource Management Committee (KRMC). It is based on community and stakeholder consultation undertaken over a number of years and integrates:

- consultation on marine protected area management measures (2005);
- content from previous community management plans, including:
    - the draft *Kilaka Forest Reserve Management Plan* (2006) based on numerous village and KRMC consultations;
    - the *Namena Marine Reserve Management Plan* (2007); and
    - the draft *Kubulau Qoliqoli Management Plan* (2007).
- the outcomes of a three-day management planning workshop, attended by chiefs, resource owners, government representatives and conservation partners (February 2009); and
- consultations with civil society and government stakeholders (May 2009).

Socioeconomic surveys of Kubulau households in 4 villages (Navatu: n = 15 households; Natokalau: n = 9; Kiobo: n = 6; Nakorovou: n = 14) were conducted in August 2009 following endorsement of the management plan, in which a series of questions were asked to gauge level of awareness of management rules specified in the EBM plan (Table 1). Navatu, Kiobo, and Nakorovou were particulary targeted because they include traditional fishing rights owners (TFROs) for each of the now declared no-take, district MPAS (Namena, Namuri and Nasue, respectively). Natokalau was surveyed as a comparison village without fishing rights in those regions but noted during prior visits for its exceptional organization.

While the level of awareness of management rules was generally fairly similar across all villages, certain patterns do however emerge. For example, a large majority of households in Nakorovou (79%) identified that landowners must be consulted prior to commercial logging operations commencing: this higher degree of awareness for terrestrial activities is not surprising as Nakorovou residents are less dependent on marine resources and derive more income from land-based activities. By contrast, they had comparatively lower awareness of specific marine regulations (i.e. types of species forbidden to harvest).

Table 1. Questions asked to heads of households in Navatu (n = 15), Kiobo (n = 6), Natokalau (n = 9), and Nakorovou (n = 14) villages to gauge awareness of management rules in Kubulau EBM plan. Scoring system to rank responses is shown at right.

Question	Scoring
How close to a stream bank can you clear vegetation to plant crops?	0 = wrong or don't know; 1 = correct
What needs to happen before commercial logging can begin on any native lands?	0 = wrong or don't know; 0.5 = consultation with stakeholder; 1 = consultation with stakeholder plus Environmental Impact Assessment
What types of nets are permitted to be used in an estuary?	0 = wrong / no response; 0.5 = hand net; 1 = hand net and wading net
When is there a ban on fishing for grouper	0 = wrong or don't know; 1 = August
What species are forbidden to harvest (either under Fijian law or as written in the Kubulau Draft Management Plan)?	0 = 0 correct; 0.333 = 1 species correct; 0.667 = 2-3 species correct; 1 = > 3 species
What types of fishing methods are prohibited within the qoliqoli?	0.2 points for each correct gear (1 = 5 gears)
Do you agree with the following statement 'My interests and views are adequately represented when it comes to management decisions'?	1 = strongly agree; 2 = agree; 3 = neutral 4 = disagree; 5 = strongly disagree
Do you agree with the following statement 'Members of my family take part in community meetings more frequently' since management has been put in place?	1 = strongly agree; 2 = agree; 3 = neutral 4 = disagree; 5 = strongly disagree
If you are not a decision-maker, do you have access to them to state your opinions and express your views?	1 = no; 2 = yes

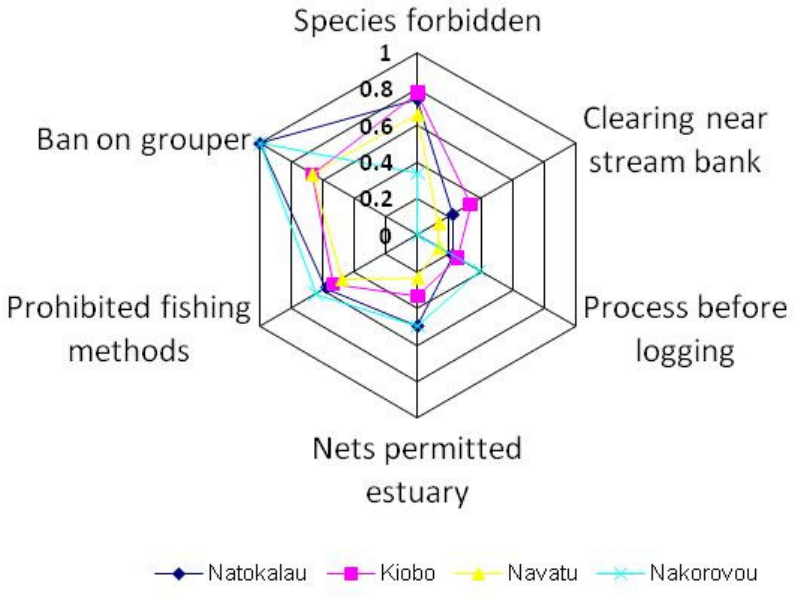

Figure 2. Radar plot of scored responses to questions relating to awareness of management rules in the Kubulau EBM plan (see Table 1 for questions and scores). Location of symbols for each village are mean response of all households surveyed.

Natokalau residents had the broadest awareness (highest average rank of scores for all questions asked). Anecdotal evidence suggests that this village has a high level of community organization, trust among residents (e.g. they have developed their own community banking systems), and active participation in resource management. Meanwhile, Navatu village had the lowest mean rank of scores, which may be due to deliberate resistance to participation in management activities due to dissatisfaction with some of the management rules (see Respect for traditional authority section below). In addition, of all four villages polled, Navatu residents: had more concern (from a few key individuals) that their interests were not being adequately represented in management decisions (Figure 3); and were the only Kubulau residents to respond that they did not have access to decision makers (n = 3 of 16 heads of households).

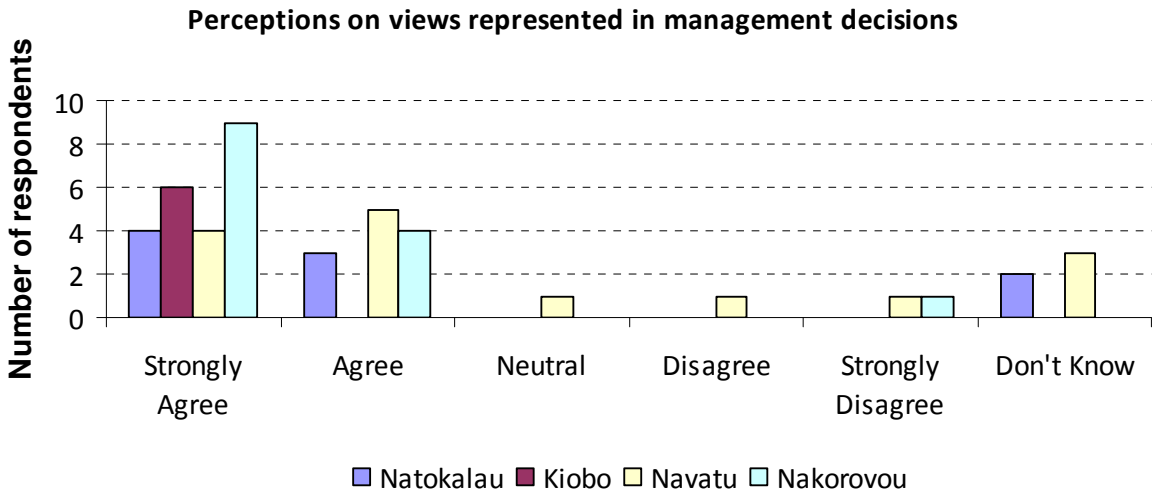

Figure 3. Responses of heads of households in Natokalau (n = 9), Kiobo (n = 6), Navatu (n = 15) and Nakorovou (n = 14) to the statement 'My interests and views are adequately represented when it comes to management decisions'.

Awareness of MPA boundaries

A resource mapping exercise was carried in Kubulau, which served a dual purpose to: (1) assess current preferred fishing locations in order to minimize costs of potential future additions to the MPA network; and (2) assess awareness of MPA boundaries. Fishers from the four above villages were given blank maps on which to record their preferred fishing locations during both calm and windy conditions: responses were digitized in ArcGIS version 9 software and pooled across responses from 2008 and 2009 surveys (Figure 4).

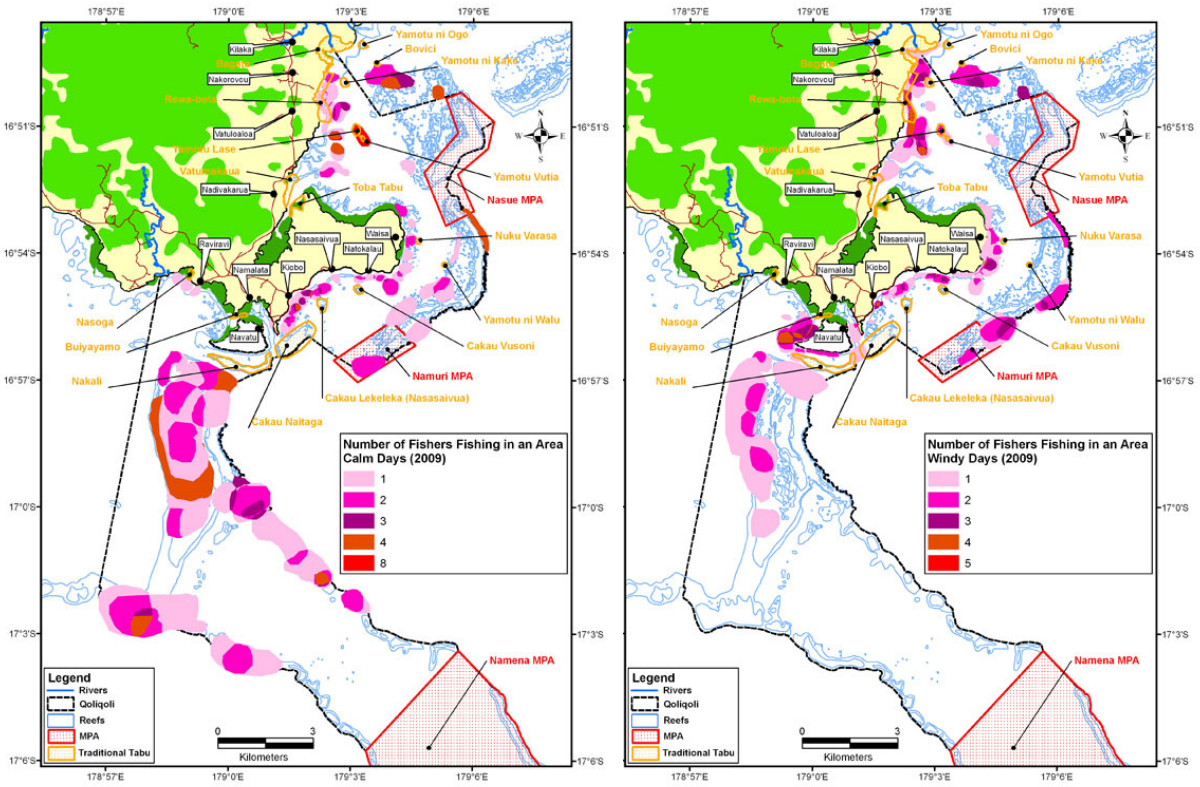

Figure 4. Preferred fishing locations of Kubulau fishers from Navatu, Natokalau, Kiobo and Nakorovou pooled from 2008 and 2009 surveys for (LEFT) calm days and (RIGHT) windy days. Colors indicate the frequency of selection as preferred fishing areas (pink = preference of fewer fishers; red = preference of more fishers).

With respect to fishing within MPAs and tabu areas, respondents repeatedly selected preferred fishing locations inside of Namuri MPA, the southern tip of Nasue MPA, and community tabu areas of Rewa Bota, Yamotu Lase and Cakau Vuti (Nakorovou tabus). Actual catch locations recorded by fishers from Navatu, Kiobo, Nakorovou, Raviravi and Kilaka villages during catch per unit effort (CPUE) data collection by trained Kubulau volunteers between May 2008 and June 2009 (Cakacaka et al. 2010) also indicate local breaches of MPA rules by residents of all above villages except Raviravi (Figure 5). While some of the poaching may be deliberate due to a perception of highly abundant resources and lack of respect for authority, a large proportion of the records of preferred fishing and catch locations within MPAs is likely due to lack of awareness of boundaries. In the case of Nakorovou community tabus, it is also possible that residents are not even aware of their existence as their declaration may have been poorly communicated internally within the village.

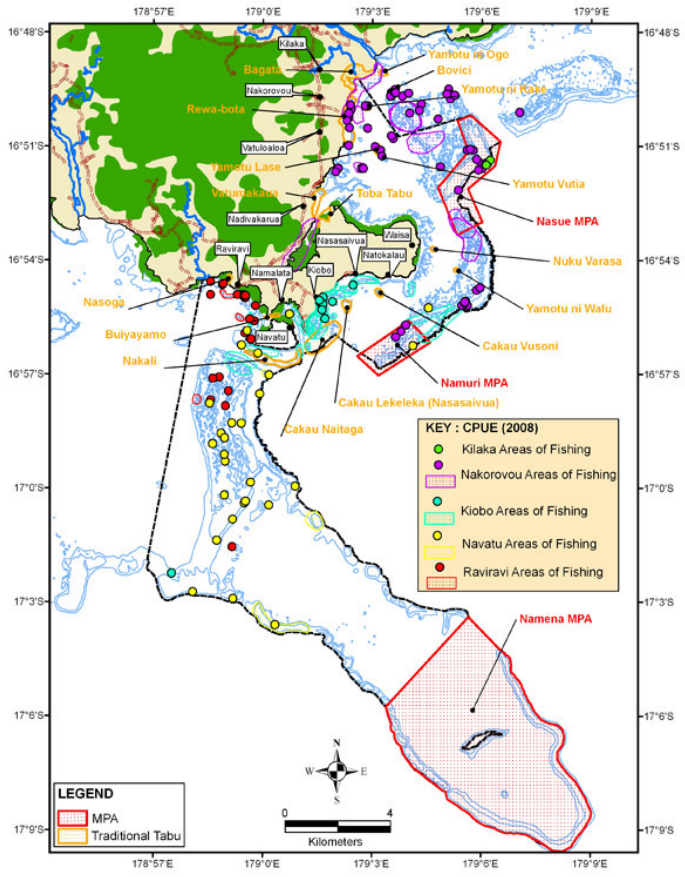

Figure 5. Catch locations recorded by village from CPUE surveys collected ~weekly between May 2008 and June 2009 by trained community volunteers. As with the resource mapping exercise, fishers were given blank maps on which to record locations. Colors indicate village: green – Kilaka; purple – Nakorovou; turquoise – Kiobo; Yellow – Navatu; red – Raviravi.

Perceptions of management rules

Heads of households were additionally asked about their perceptions of the level of management rules and regulations for traditional fishing rights owners (TFROs; Figure 5). The majority of respondents from all villages thought that, in general, rules should be made more strict with greater penalties, however there was notable dissension from a few respondents, particularly 5 in Navatu and 1 in Kiobo, who feel that the rules should be made somewhat less strict.

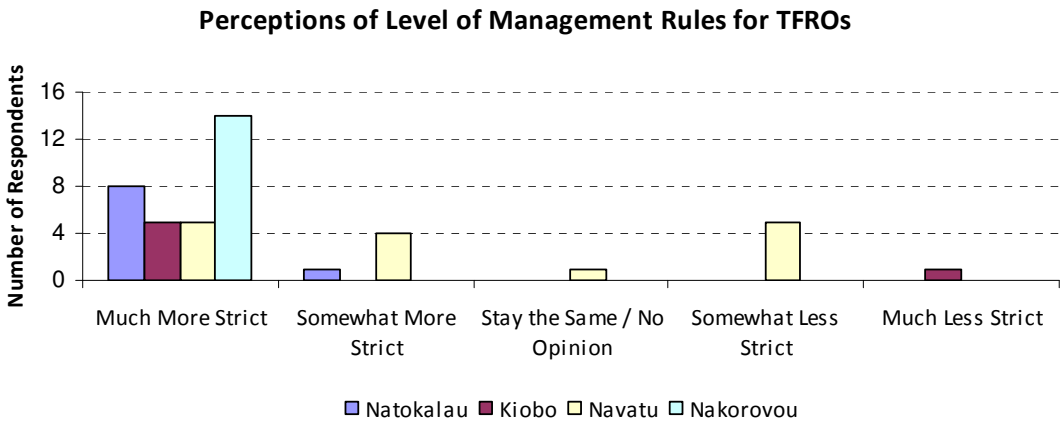

Figure 5. Responses of heads of households in Natokalau (n = 9), Kiobo (n = 6), Navatu (n = 15) and Nakorovou (n = 14) to the question: 'How do you feel about the current level of rules and regulations for resource owners and their family members?'

Respect for traditional authority

In the Pacific, compliance with local resource management rules relies to a significant extent on respect for traditional authority and decision-making processes (Aswani 2005; Brooks et al. 2006). Management planning processes that respect and reinforce the roles of traditional leaders, while providing opportunities for broad community engagement, strengthen long-term prospects for community-based resource governance (Lal 2005). Perceptions of inequity, exclusion from decision-making processes or failure to respect traditional resource rights may result in challenges to traditional authority. Customary institutions, already undermined by a range of historical factors, may be further eroded by access to new markets for natural resources (Cinner et al. 2007). Loss of respect for traditional authority may cause people to commit acts that violate community rules. In Fiji, enforcement of community management rules is constrained by the national legal system: local communities have no formal authority to enforce management rules, and certain community-imposed sanctions may breach national criminal laws (Veitayaki 2000).

Observational evidence and socioeconomic surveys have indicated that loss of respect for traditional authority and access to markets may be primary drivers of repeated and public incidents of illegal fishing in the Namena Marine Reserve within Kubulau qoliqoli. The Namena Marine Reserve is not legally gazetted. Its success has largely relied on respect for traditional chiefly authority and, to a lesser extent, a misconception that the reserve is protected under national legislation. In general, compliance with the community prohibition on fishing in marine reserve has been greatly assisted by the vigilance of the owners of Namena Island Resort, located within the reserve though there was a sanctioned opening of the MPA in August 2008 following the Tui Kubulau's death in August 2008, when nearly 700 kg of fish were harvested for the funeral (WCS, unpublished data).

Table 3. Preferred fishing gear types used by fishers before and after the marine protected area network was established, based on responses from household surveys in Kubulau in 2009. Illegal/destructive gear includes: fish poison, fine gill nets, and use of SCUBA. Gear requiring management includes: larger gill nets, speargun, and Hawaiian sling. Minimally destructive gear includes: hand nets, hand spear, and hook and line.

	Fishing Gear Class		
Village	**Illegal/Destructive**	**Requires Management**	**Minimally Destructive**
Before management			
Kiobo	30.0%	10.0%	60.0%
Navatu	37.9%	24.2%	37.9%
Nakorovou	3.7%	25.9%	70.4%
After management			
Kiobo	0.0%	22.2%	77.8%
Navatu	13.8%	27.6%	58.6%
Nakorovou	0.0%	25.9%	74.1%

One of the two clans in Navatu village has traditional fishing rights (*kanakana*) within the Namena Marine Reserve, and there has long been some dissension about the closure of their traditional fishing grounds without adequate compensation. This is reflected in 2009 household surveys from Navatu village where only 33% and 20% of households reported that they usually agree with decisions by the *Bose Vanua* and KRMC, respectively (Figure 6). These responses contrast notably with those from the two other villages, Kiobo and Nakorovou, who have traditional fishing rights in other district MPAs within the qoliqoli. Members of Navatu are open and honest about their non-compliance: 8 of 15 heads of households surveyed reported that they personally never or only sometimes comply with protected area rules, including respecting boundaries (Figure 7). Furthermore, Navatu residents are the only ones to admit to continued use of illegal gear following the establishment of the protected area network (Table 3).

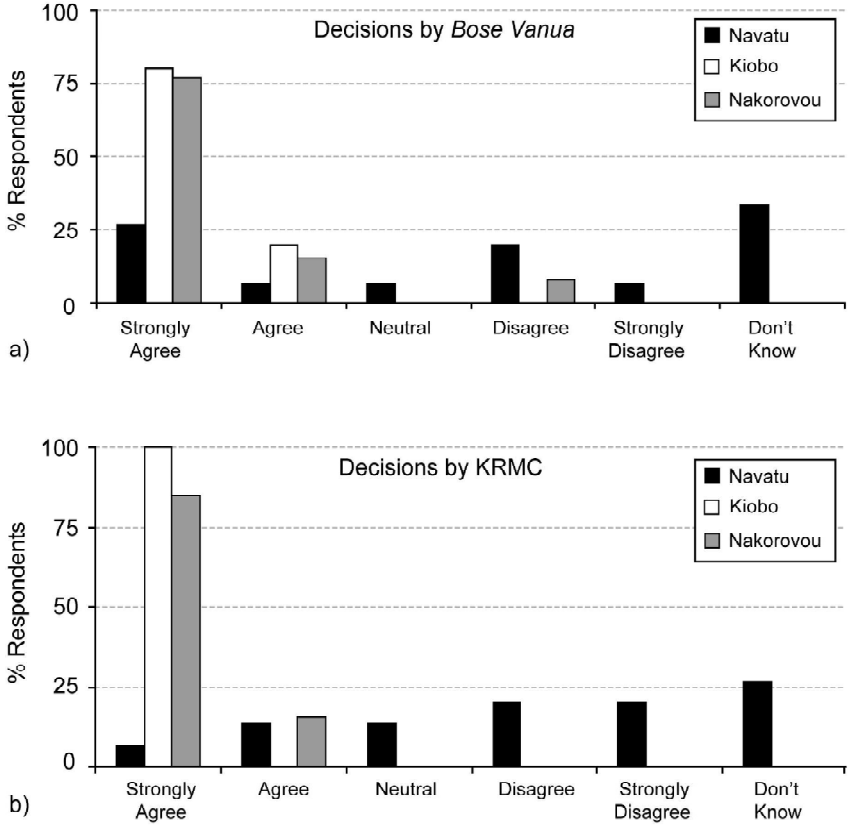

Figure 6. (a) Proportion of responses by village in 2009 household surveys of Kubulau to the statement: "I usually agree with the decisions by the council of chiefs (Bose Vanua). (b) Proportion of responses by village to the statement: "I usually agree with decisions by the Kubulau Resource Management Committee (KRMC)". (Number of households surveyed per village: Navatu: n = 15 of 18; Kiobo: n = 5 of 8; Nakorovou: n = 13 of 18)

Following discussion about the lack of effective protection for the Namena Marine Reserve during a management planning workshop in February 2009, fishermen from Navatu village were found fishing in the reserve. The fishermen, upon learning that the reserve was not legally protected, may have deliberately set out to be caught to challenge traditional authority. To

counter the challenge, the Tui Kubulau called on clan chiefs and church ministers to conduct a traditional blessing of the district's marine reserves to enhance their recognition throughout Kubulau and neighbouring districts. Navatu fishers were again found fishing in Namena Marine Reserve the following week.

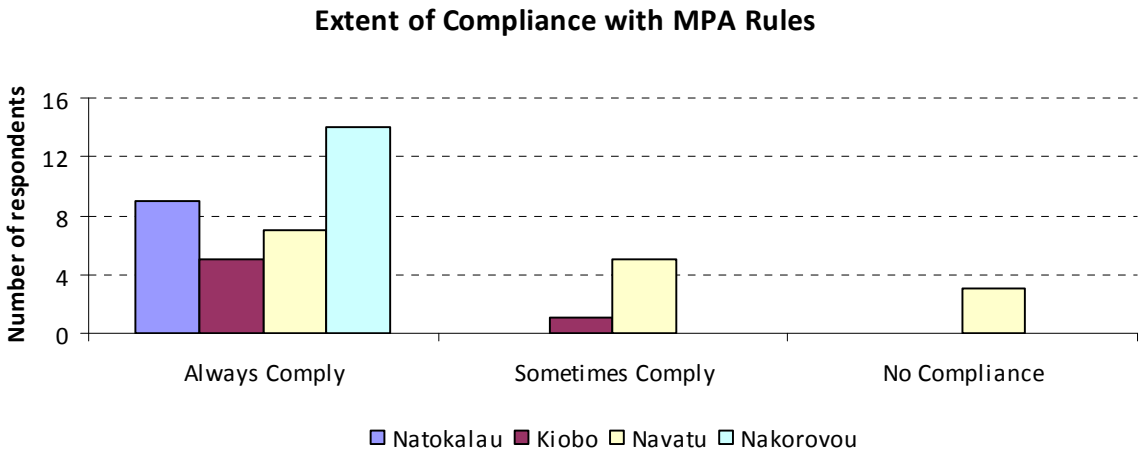

Figure 7. Responses of heads of households in Natokalau (n = 9), Kiobo (n = 6), Navatu (n = 15) and Nakorovou (n = 14) to the question: 'To what extent do you comply with the protected area rules, including respecting boundaries?'

Conclusions and recommendations

It is clear from the responses of Navatu residents that some individuals within the village are unhappy with the management rules within the Kubulau qoliqoli. The clan with traditional fishing rights in Namena Marine Reserve strongly feels that they are bearing a larger burden of the costs because they have not been adequately compensated for the loss of their traditional fishing rights. This appears to be the main driver behind the non-compliance in most cases observed. One important lesson learned from these experiences is the importance of ensuring that distribution of costs and benefits is considered early in the management planning process in order to reduce potential conflict (Lal 2005). In addition, mapping tenure boundaries, including overlapping and competing claims, may help to avoid management conflicts. For example, in Kubulau, clearer understanding of the relationship between village fishing areas (*kanakana*) and the district fishing ground (*qoliqoli*) when designing protected area boundaries might have helped to avoid conflict with Navatu village, enhancing the effectiveness of the Namena Marine Reserve while minimizing the opportunity costs to Navatu given its stronger dependence on marine resources than other villages in the district (Klein et al. 2008).

Awareness raising programs need to be specifically targeted to the knowledge gaps in each village. For example, while Nakorovou residents may be well versed on management needs for terrestrial systems. Yet because they still derive some food and income from fishing, they need broader communication throughout the village of the location of the boundaries of their own community tabu areas and district MPAs, in addition to specific knowledge on protected species. There is a clear mismatch in Nakorovou between their perceived and actual compliance

with respecting MPA boundaries. In the case of Navatu, some attempts should be made to increase community participation, particularly of fishers, in management activities to raise awareness of protected species and forbidden fishing practices. This may first require some conflict resolution exercises and possible compromises with management rules or boundaries in order to bring non-compliant fishers to a position where they are willing to implement contested management actions.

Further options to improve the awareness of existing tabu areas and district MPAs should also include clear demarcation of protected areas. Even if the community members are aware of the existence of closed areas, they are not always clear on the exact boundaries. Marking the boundaries may additionally improve enforcement as it will be visually easier to determine whether fishers are actively fishing within the protected areas.

BIOLOGICAL CONSEQUENCES OF FISHING IN MPAs

MPAs have increasingly become more popular as management tools to advert strong declines in fish stock, habitat destruction, loss of biodiversity and ecosystem services (Lester et al. 2009). However, MPAs may only yield positive fisheries benefits insofar as fishers comply with their rules and regulations. Models that investigate different levels of poaching on MPAs suggest that it can eliminate any benefits to surrounding areas that are expected from protected areas (Byers and Noonburg 2007).

An additional challenge to the biological success of MPAs in the Pacific is that periodic harvests are a traditional feature of customary management schemes. While some studies have shown increases in fish biomass and abundance compared with open areas despite periodic openings (Cinner et al. 2005b; Bartlett et al. 2009), others have shown that these measured increases can be removed within a single harvest event (Williams et al. 2006). Moreover, it has been found that even small amount of fishing pressure (period opening, partial reserves, poaching) can offset long-term benefits of protection on exploited species (Kulbicki et al. 2007).

This study documents the effect of a prolonged (4 week), intensive harvest on reef fish populations in Cakaulevu tabu, Macuata Province, Vanua Levu. While the communities of Kia Islands received permission from the Tui Macuata to open the MPA, this example is instructive to show how sustained fishing, whether sanctioned or not, can affect fish population structure and influence recovery potential.

Cakaulevu tabu, Macuata

Underwater visual census (UVC) surveys at two different depths on the forereef inside and outside the Cakaulevu tabu area off Kia Island (Vanua Levu, Macuata Province) using the exact methods for data collection and cleaning of (Jupiter et al. 2010). Given strong differences in reef geomorphology, the Cakaulevu tabu was divided into a northern and southern area with a control area located south of the tabu (Figure 8). Two sites were sampled in each of the three areas and two depths within each site. All sites were sampled prior to the opening event (September 2008) and again after four weeks of intensive harvesting within the Cakaulevu tabu

for a community fundraiser (October 2008). The unforeseen opening of the Cakaulevu tabu restricted the pre-opening sampling to three days and two sites within each of the sampling areas. All sites were chosen based on a baseline survey conducted in the study area in 2006. A Kruskal-Wallis one-way ANOVA on ranks was used followed by a post-hoc Dunn's multiple comparison test to assess differences in total fish, primary targeted fish, abundance and biomass between the different areas and surveys. To compare the pre-harvest and post-harvest results a nonparametric Wilcoxon matched pair test was employed.

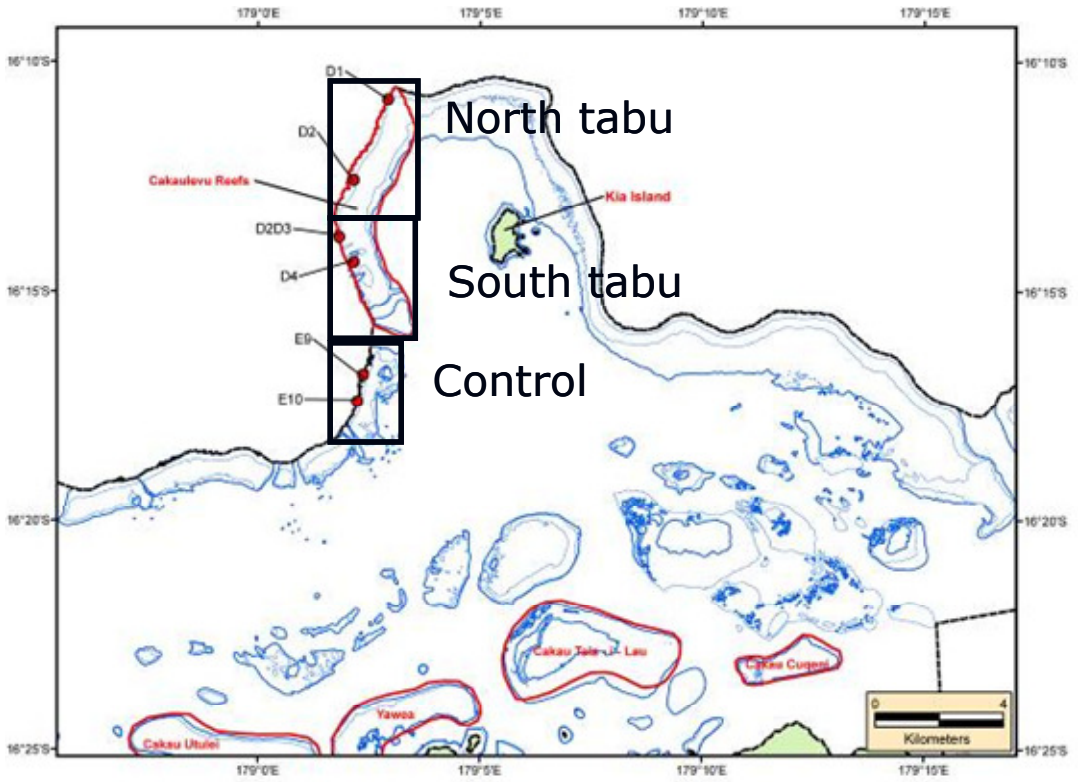

Figure 8. Map of Kia Island and Cakaulevu tabu (outlined in red) in Macuata Province, Vanau Levu, Fiji Islands. The study area is divided in north tabu, south tabu, and control area.

Prior to the harvest event there was a clear increasing gradient from the control to southern and northern tabu area for: abundance, biomass, ratio of large (>25 cm) to small fish (<25 cm), and primary target fish (Figure 9a-d). The protected area harboured more and bigger fish (and primary target fish) with even larger and more abundant fish in the northern tabu area, likely supported by the steep reef wall and high currents maintaining high natural reef productivity. This gradient breaks down after the harvesting event and even reverses in the case of biomass of primary target fish (Figure 9d).

The northern tabu area showed statistically significantly greater abundance and biomass than the control area for all four measures pre-harvest and remains only just higher in biomass post-harvest. Following the harvest, the biomass of primary target fish in the control area increases

significantly to levels well above the protected area ones (even though the difference between the areas is not statistically significant; Figure 9d).

The breakdown of the natural gradient (north > south > control) is most obvious in the ratio between fish >25 cm (fork length) to fish ≤25cm, where there are statistically significant pre-harvest differences between both protected areas (north and south) and the control area (Figure 9c). After the harvest, the ratios area very similar in all three areas and no statistical difference area observed. This is also reflected in the large increase in biomass in the control area where there was little or no fishing during this period.

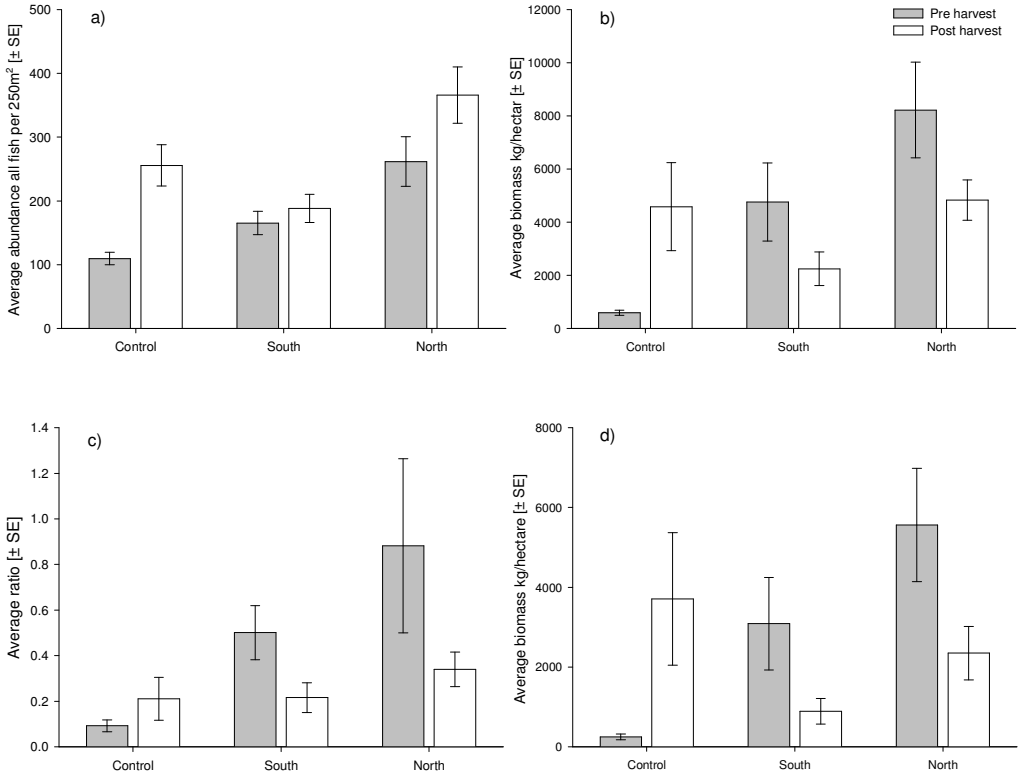

Figure 9. Differences before (grey) and after (white) a four week intensive harvest of Cakaulevu tabu in: (a) total fish abundance (# per transect); (b) biomass (kg/ha); (c) ratio of large fish >25 cm to small fish < 25 cm; and (d) biomass of primary target fish (kg/ha).

The breakdown of changes in biomass of primary target fish by area and families shows which families are particularly affected by the harvesting event (Figure 10). In the northern area, the biomass of Acanthuridae and Carangidae were heavily reduced by the fishing (Figure 10c). Schooling Naso spp. and carangids were easy targets for spearfishermen and were removed in large quantities. In the southern portion of the tabu area, Lethrinidae, Lutjanidae and Scaridae were strongly affected by the harvesting (Figure 10b). As acanthurids and carangids were not initially present in high abundance in the southern tabu, fishers sought other primary food fish which tend to be more difficult targets as some species hide under reef ledges during the day

(e.g. Sluka and Reichenback 1996). In the control areas, there was an increase in biomass following the harvest in all but one of the families (Carangidae) that declined during the harvesting event in the southern and northern tabu area (Figure 10a).

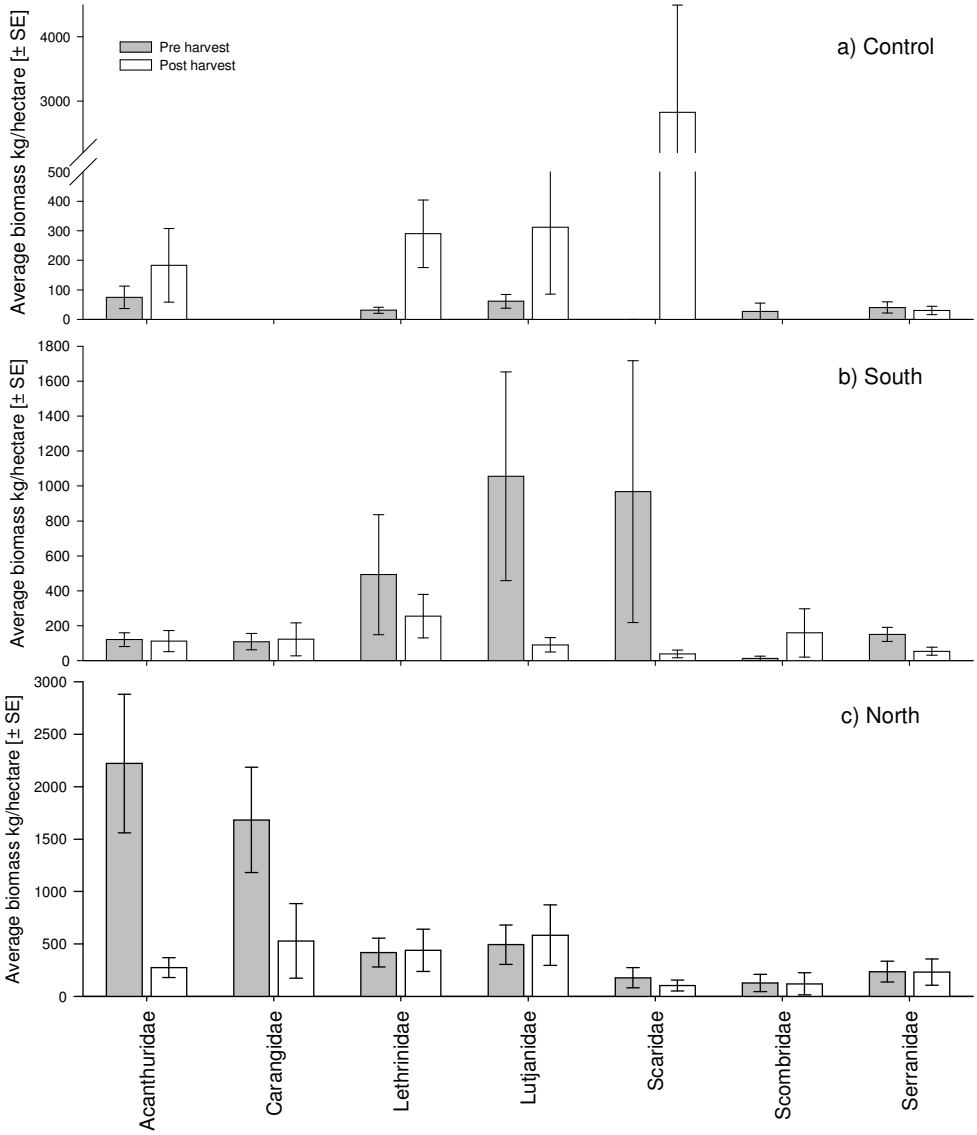

Figure 10. Differences in pre- (grey) and post- (white) harvest biomass (kg/ha) of major targeted food fish families in the (a) control areas; (b) southern part of Cakaulevu tabu; and (c) northern part of Cakaulevu tabu.

The results of this study echo other findings that a single intensive harvest event or intensive fishing for a protracted period following opening can remove all positive effects of protection in managed areas (Russ and Alcala 2003; Williams et al. 2006). The main effect of the harvest event was seen in primary target fish, which suggests that fishing was the main cause of the dramatic reduction in biomass observed in the protected area. In addition, it was demonstrated that results from surveys using abundance alone (with no size estimates) need to be

interpreted cautiously. By contrast, the observed increase in numbers in the northern part of the tabu masks the true impact of the harvesting event on the fish assemblage: fishing resulted in a population of more abundant, smaller fish when the larger, targeted species were removed. An increase in abundance of fish could have lead to the false conclusion that harvesting a protected area can be beneficial.

Conclusions and Recommendations

Given these results, we advocate a precautionary approach of adopting **permanent no-take** areas (marine reserves) in the broader management scheme (Russ and Alcala 2003). Furthermore, the no-take closures need to be backed by high levels of compliance and enforcement as even low levels of fishing can prevent recovery (Denny and Babcock 2004; Lester et al. 2009). A comparison of multiple MPAs revealed that with the same level of protection, only the ones with a high level of compliance (or enforcement) showed a recovery of the exploited species (Guidetti et al. 2008). To maximise the benefits of MPA and their networks it is preferable to have less and larger closed areas where the infringement impact is minimised at the edges (Little et al. 2005).

RECOMMENDATIONS FOR LEGAL AND INSTITUTIONAL REFORM

Long-term effectiveness of CBNRM initiatives in Fiji requires significant legal and institutional reform (Evans 2006; Lane 2008). Because customary management rules do not have formal legal standing in Fiji unless they have been previously converted into national legislation (Minter 2008), legal recognition of traditional resource tenure and decision-making processes can enhance the effectiveness of CBNRM (Reti 1993; Lynch and Alcorn 1994). Conversely, failure to legally recognise traditional resource tenure and decision-making processes may lead to resource conflict and, when combined with limited government capacity, can result in poor resource management outcomes (Lindsay 1998). To effectively manage natural resources, community-based managers need secure and certain rights, as well as the flexibility and power ('legal space') to make decisions that reflect their unique circumstances and priorities (Lindsay 1998) and to be able to issue sanctions for infringements that bear weight with offenders. The Fiji national government is currently developing new legislation for fisheries and protected areas, which may resolve some of the issues outlined in the previous sections.

Community conservation initiatives provide insights into practical barriers to effective resource management and opportunities for engaging with government institutions to resolve these issues. The experiences of locally managed marine areas (LMMAs) across the country have allowed the identification of priorities for legal and institutional reform in the fisheries sector, including:

- improved training and resources for community fish wardens;
- fisheries enforcement training for police and magistrates;
- increased penalties for offences under the *Fisheries Act*;
- powers for the Department of Fisheries to revoke fishing licences for breaches of the *Fisheries Act*;
- a clear and efficient process for gazetting legally binding restricted areas; and

- formalised management powers for community resource management committees (Minter 2008).

In the existing legal context, communities can improve marine management outcomes by:

- protecting *tabu* areas using licence conditions;
- apprehend traditional resource owners who are selling fish without a licence;
- not renewing licences for vessels that wilfully breach community rules or national laws;
- increasing fish warden patrols; and,
- reporting breaches to police, fisheries officers and the Fiji LMMA network (Minter 2008).

The absence of a coherent legal framework for protected areas presents challenges for effective site-based conservation. In particular, existing laws do not provide for the active involvement of resource owners in the identification, establishment and management of protected areas. Existing legal mechanisms, such as restricted areas, tend to be inflexible, with no opportunity for resource owners to develop management rules, or to modify those rules over time (Lindsay 1998; Clarke and Gillespie 2008). There is a pressing need to develop protected areas legislation that provides for management of protected areas by local communities, in collaboration with government agencies and civil society organisations. Mechanisms for fair and equitable distribution of economic benefits from conservation areas must be trialled and replicated to reduce local conflict and increase long-term management effectiveness (Lal 2005).

Ultimately, effective resource management is likely to rely on the emergence of hybrid models of governance, which respect local traditions, practices and resource rights and share responsibility for planning, implementation and enforcement of management measures between communities and government institutions, taking into account their respective strengths and limitations (Reti 1993; Aswani 2005; Cinner et al. 2005a; McClanahan et al. 2006; Aswani et al. 2007). Particularly in the South Pacific, national laws and institutions must recognise the legitimate and enduring role of local communities in natural resource management (Lindsay 1998). To do otherwise ignores the realities of resource management in the Pacific islands, and overlooks the opportunity to build on the region's rich and ancient heritage of community-based resource management.

REFERENCES

Aswani S (1999) Common property models of sea tenure: a case study from Roviana and Vonavona Lagoons, New Georgia, Solomon Islands. Human Ecology 27: 417-453

Aswani S (2005) Customary sea tenure in Oceania as a case of rights-based fishery management: Does it work? Reviews in Fish Biology and Fisheries 15: 285-307

Aswani S, Hamilton RJ (2004) Integrating indigenous ecological knowledge and customary sea tenure with marine and social science for conservation of bumphead parrotfish (*Bolbometopon muricatum*) in the Roviana Lagoon, Solomon Islands. Environmental Conservation 31: 69-83

Aswani S, Albert S, Sabetian A, Furusawa T (2007) Customary management as precautionary and adaptive principles for protecting coral reefs in Oceania. Coral Reefs 26: 1009-1021

Bartlett CY, Manua C, Cinner JE, Sutton S, Jimmy R, South R, Nilsson J, Raina J (2009) Comparison of outcomes of permanently closed and periodically harvested coral reef reserves. Conservation Biology:DOI: 10.1111/j.1523-1739.2009.01293.x

Brooks TM, Mittermeier RA, da Fonseca GAB, Gerlach J, Hoffmann M, Lamoreux JF, Mittermeier CG, Pilgrim JD, Rodrigues ASL (2006) Global biodiversity conservation priorities. Science 313: 58-61

Byers JE, Noonburg EG (2007) Poaching, enforcement, and the efficacy of marine reserves. Ecological Applications 17: 1851-1856

Cakacaka A, Jupiter SD, Egli DP, Moy W (2010) Status of fin fisheries in a Fijian traditional fishing ground, Kubulau District, Vanua Levu. Wildlife Conservation Society-Fiji Technical Report no. 06/10. Suva, Fiji, 18 pp

Care JC, Zorn JG (2001) Legislating pluralism - statutory developments in Melanesian customary law. Journal of Legal Pluralism and Unofficial Law 46: 49-101

Christie P, McCay BJ, Miller ML, Lowe C, White AT, Stoffle R, Fluharty DL, McManus LT, Chuenpagdee R, Pomeroy C, Suman DO, Blount BG, Huppert D, Eisma RLV, Lowry K, Pollnac RB (2003) Toward developing a complete understanding: a social science research agenda for marine protected areas. Fisheries 28: 22-26

Cinner JE (2007) Designing marine reserves to reflect local socioeconomic conditions: lessons from long-enduring customary management systems. Coral Reefs 26: 1035-1045

Cinner JE, McClanahan TR (2006) Socioeconomic factors that lead to overfishing in small-scale coral reef fisheries of Papua New Guinea. Environmental Conservation 33: 73-80

Cinner JE, Marnane MJ, McClanahan TR (2005a) Conservation and community benefits from traditional coral reef management at Ahus Island, Papua New Guinea. Conservation Biology 19: 1714-1723

Cinner JE, Sutton SG, Bond TG (2007) Socioeconomic thresholds that affect use of customary fisheries management tools. Conservation Biology 21: 1603-1611

Cinner JE, Marnane MJ, McClanahan TR, Almany GR (2005b) Periodic closures as adaptive coral reef managment in the Indo-Pacific. Ecology and Society 11:31. http://www.ecologyandsociety.org/vol11/iss31/art31

Clarke P, Gillespie T (2008) Legal mechanisms for the establishment and management of terrestrial protected areas in Fiji. IUCN Regional Office for Oceania, Suva, Fiji.

Denny CM, Babcock RC (2004) Do partial marine reserves protect reef fish assemblages? Biological Conservation 116: 119-129

Evans N (2006) Natural resources and the environment in Fiji: A review of existing and proposed legislation. IWP-Pacific Technical Report (International Waters Project) no. 21. Secretariat of the Pacific Regional Environment Programme, Apia, Samoa, 56 pp

Fiji Times (2007) 'Old' fisheries laws to be reviewed. Fiji Times. 23 August 2007

Fiji Times (2008) Paramount chief in court on fish theft charge. Fiji Times. 10 December 2008

Fiji Times (2010) Chief hails lawmen in poaching battle. Fiji Times. 13 January 2010

Fiji Sun (2008) Fish wardens told of their roles. Fiji Sun. 20 September 2008.

Fiji Sun (2009) $10, 000 for great sea reef sevens. Fiji Sun. 14 January 2009

Govan H, Tawake A, Tabunakawai K, Jenkins A, Lasgorceix A, Schwarz A-M, Aalbersberg B,Manele B, Vieux C, Notere D, Afzal D, Techera E, Rasalato ET, Sykes H, Walton H, Tafea H, Korovulavula I, Comley J, Kinch J, Feehely J, Petit J, Heaps L, Anderson P, Cohen P, Ifopo P, Vave R, Hills R, Tawakelevu S, Alefaio S, Meo S, Troniak S, Malimali S, Kukuian S, George S, Tauaefa T, Obed T (2009) Status and potential of locally-managed marine areas in the South Pacific: meeting nature conservation and sustainable livelihood targets through wide-spread implementation of LMMAs. SPREP/WWF/WorldFish-Reefbase/CRISP, Suva, Fiji, 95 pp + 95 annexes

Govind P (2008) Managing marine resources is everyone's business. Fiji Daily Post. 8 December 2008.

Guidetti P, Vierucci E, Bussotti S (2008) Differences in escape response of fish in protected and fished Mediterranean rocky reefs. Journal of the Marine Biological Association of the United Kingdom 88: 625-627

IAS (2009) A nation-wide survey of village-based fishing pressure in Fiji. In: Jenkins AP, Prasad SR, Bacchiochi J, Skelton P, Yakub N (eds), Proceedings of the Inaugural Fiji Islands Conservation Science Forum, Wetlands International-Oceania, Suva, Fiji.

Jackson JBC, Kirby MX, Berger WH, Bjorndal KA, Botsford LW, Bourque BJ, Bradbury RH, Cooke R, Erlandson J, Estes JA, Hughes TP, Kidwell S, Lange CB, Lenihan HS, Pandolfi JM, Peterson CH, Steneck RS, Tegner MJ, Warner RR (2001) Historical overfishing and the recent collapse of coastal ecosystems. Science 293: 629-638

Janine S (2010) Police charge men. Fiji Sun. 8 January 2010

Johannes RE (1978) Traditional marine conservation methods in Oceania and their demise. Annual Review of Ecology and Systematics 9: 349-364

Johannes RE (2002) The renaissance of community-based marine resource management in Oceania. Annual Review of Ecology and Systematics 33: 317-340

Jupiter SD, Egli DP, Jenkins AP, Yakub N, Hartley F, Cakacaka A, Tui T, Moy W, Naisilisili W, Dulunaqio S, Qauqau I, Prasad S (2010) Effectiveness of marine protected area networks in traidtional fishing grounds of Vanua Levu, Fiji, for sustainable management of inshore fisheries. Wildlife Conservation Society-Fiji and Wetlands International-Oceania Technical Report 03/10, Suva, Fiji

Kikau R (2009) Poachers beat system. Fiji Times. 6 June 2009

Klein CJ, Steinback C, Scholz AJ, Possingham HP (2008) Effectiveness of marine reserve networks in representing biodiversity and minimizing impact to fishermen: a comparison of two approaches used in California. Conservation Letters 1: 44-51

Kulbicki M, Sarramégna S, Letourneur Y, Wantiez L, Galzin R, Mou-Tham G, Chauvet C, Thollot P (2007) Opening of an MPA to fishing: Natural variations in the structure of a coral reef fish assemblage obscure changes due to fishing. Journal of Experimental Marine Biology and Ecology 353: 145-163

Lal P (2005) Information, institutions and conflict management in the natural resource sector. Peace Building and Conflict Prevention Workshop

Lane MB (2008) Strategic coastal governance issues in Fiji: The challenges of integration. Marine Policy 32: 856-866

Lester SE, Halpern BS, Grorud-Colvert K, Lubchenco J, Ruttenberg BI, Gaines SD, Airame S, Warner RR (2009) Biological effects within no-take marine reserves: a global synthesis. Marine Ecology Progress Series 384: 33-46

Lindsay J (1998) Designing legal space: Law as an enabling tool in community-based management. International Workshop on Community-Based Natural Resource Management (CBNRM)

Little LR, Smith ADM, McDonald AD, Punt AE, Mapstone BD, Pantus F, Davies CR (2005) Effects of size and fragmentation of marine reserves and fisher infringement on the catch and biomass of coral trout, *Plectropomus leopardus*, on the Great Barrier Reef, Australia. Fisheries Management and Ecology 12: 177-188

Lynch O, Alcorn J (1994) Tenurial rights and community-based conservation. In: Western D, Wright RM (eds) Natural Connections: Perspectives in Community-based Conservation. Island Press, Washington D.C., USA.

McClanahan T (1999) Is there a future for coral reef parks in poor tropical countries? Coral Reefs 18: 321-325

McClanahan TR, Marnane MJ, Cinner JE, Kiene WE (2006) A comparison of marine protected areas and alternate approaches to coral-reef management. Current Biology 16: 1408-1413

Minter A (2008) Compliance and enforcement for coastal fisheries management in Fiji. IUCN Regional Office for Oceania, Suva, Fiji, 61 pp

Munro DM (1996) A case study of traditional marine management systems in Pukapuka Atoll, Cook Islands. FAO Field Report (RAS/92/T05) 96/2, Rome, 68 pp

Nakeke A (2008a) Fisheries law confuses villagers. Fiji Sun. 29 August 2008

Nakeke A (2008b) Navy seals protect fishing ground. Fiji Daily post. 17 July 2008

Nakeke A (2008c) The future is now for youths in MPAs. Fiji Times. 04 June 2008

Nakeke A (2009) Tabu areas set to protect fish. Fiji Sun. 8 June 2009

NZLC (2006) Converging currents: Custom and human rights in the Pacific. Study Paper 17. New Zealand Law Commission, Wellington, New Zealand, 312 pp

Panapasa G (2008) Managing fish stocks. Fiji Times. 29 June 2008

Pauly D, Watson R, Alder J (2005) Global trends in world fisheries: impacts on marine ecosystems and food security. Philosophical Transactions of the Royal Society B 360: 5-12

Ralogaivau T (2008) Fishing ground owners accuse police. Fiji Times. 12 December 2008

Rarubalavu U (2009) Poaching threat. Fiji Times. 19 February 2009

Reti I (1993) The role of custom in environmental management and law in the Pacific. In: Boer B (ed) Strengthening environmental legislation in the Pacific Region Workshop, SPREP, Apia, Samoa

Russ GR, Alcala AC (2003) Marine reserves: rates and patterns of recovery and decline of predatory fish, 1983-2000. Ecological Applications 13: 1553-1565

Silatoga S (2009) Illegal fishing cut down. Fiji Times. 23 June 2009

Sluka RD, Reichenbach N (1996) Grouper density and diversity at two sites in the Republic of Maldives. Atoll Research Bulletin 438: 1-16

Tiraa A (2006) *Ra'ui* in the Cook Islands - today's context in Rarotonga SPC Traditional Marine Resource Management and Knowledge Information Bulletin # 19 Noumea, New Caledonia, pp 11-15

Veitayaki J (1997) Traditional marine resource management practices used in the Pacific Islands: an agenda for change. Ocean & Coastal Management 37:123-136

Veitayaki J (2000) Fisheries resource-use culture in Fiji and its implications. In: Hooper A (ed) Culture and sustainable development in the Pacific. Asia Pacific Press, Canberra, Australia, pp 116-130

WCS (2009) Ecosystem-Based Management Plan: Kubulau District, Vanua Levu, Fiji. Wildlife Conservation Society, Suva, Fiji, 121 pp

Williams ID, Walsh WJ, Miyasaka A, Friedlander AM (2006) Effects of rotational closure on coral reef fishes in Waikiki-Diamond Head Fishery Management Area, Oahu, Hawaii. Marine Ecology Progress Series 310: 139-149

Annex A. Fisheries Act Excerpts

Excerpts from the Fiji *Fisheries Act (Cap 158)* that support customary management of marine protected areas within traditional fishing grounds. The Act: provides for registration of traditional fishing grounds (*qoliqoli*); recognizes resource owner's subsistence fishing rights; prohibits fishing for 'trade or business' without a license; empowers the Minister to establish restricted areas and adopt management measures; and empowers the Permanent Secretary to appoint honorary fish wardens.

LAWS OF FIJI

CHAPTER 158

FISHERIES

Ordinances No 4 of 1941, 14 of 1943, 2 of 1945,
20 of 1949, 8 of 1951, 16 of 1958, 34 of 19S9,
26 of 1964, 7 of 1966, 37 of 1966 Act No 34 of 1976,
22 of 1977, Legal Notice No 87 of 1979
Decree No. 46 of 1991.

AN ACT TO MAKE PROVISION FOR THE REGULATION OF FISHING

[1st January, 19421][sic]

Minister may appoint honorary fish wardens

3. The Minister* may appoint honorary fish wardens whose duties shall be the prevention and detection of offences under this Act and the enforcement of the provisions thereof.
(Inserted by 34 of 1959, s2 Amended by 112 of 1970)
*· Delegated to Permanent Secretary for Agriculture and Fisheries by notification 11th November, 1965.

Licence to take fish

5. (1) A licensing officer may in his discretion grant licences to take fish in Fiji fisheries waters.
(Amended by 22 of 1977, s2)

(2) Every licence granted under this Act shall terminate on the 31st December next after the day of issue. It shall be personal to the holder, shall not be transferable and shall be subject to such conditions as the licensing officer shall think fit to endorse thereon in accordance with this Act or any regulations made thereunder.

Protection of native customary rights

13. (1) Notwithstanding anything contained in the Rivers and Streams Act, it shall be an offence for any person to take fish on any reef or on any kai (cockle) or other shellfish bed in any area in respect of which the rights of any mataqali or other division or subdivision of the Fijian people have been registered by the Native Fisheries Commission in the Register of Native Customary Fishing Rights unless he shall be a member of such mataqali, division or subdivision of the Fijian people who does not require a licence under section 5 to take such fish or shall first have obtained a permit to do so from the Commissioner of the Division in which such area is situated:
(Cap 136)

Provided that-

(a) such permits shall not be necessary in the case of persons taking fish (other than by way of trade or business or as the employee of a person carrying on the trade or business of a fisherman) with hook and line or with a spear or portable fish trap which can be handled by one person; and

(b) any such permit may exclude fishing for particular species of fish, or may exclude fishing in any particular areas, or may exclude fishing by any particular methods, or may contain any combination of such exclusions.

(2) The grant of a permit shall be in the discretion of such Commissioner who shall consult the Fisheries Officer and the subdivision of the Fijian people whose fishing rights may be affected thereby, prior to granting the same.

(3) A permit may be granted for any period not exceeding three years, but every such permit shall expire on the 31st day of December in any one of such years.
(Section substituted by 26 of 1964. s.6.)

Regulations

9. The Minister may make regulations:-

(a) prohibiting any practices or methods, or employment of equipment or devices or materials, which are likely to be injurious to the maintenance and development of a stock of fish;

(b) prescribing areas and seasons within which the taking of fish is prohibited or restricted, either entirely or with reference to a named species;

(c) prescribing limits to the size and weight of fish of named species which may be taken;

(d) prescribing limits to the size of nets or the mesh of nets which may be employed in taking fish either in Fiji fisheries waters or in any specified part thereof;

(e) regulating the procedure relating to the issue of and cancellation of licences and the registration of fishing boats and prescribing the forms of applications and licences therefore and the conditions to be attached thereto;

(f) prescribing the fees to be charged upon the issue of licences and the registration of fishing vessels which fees may differ as between British subjects and others;

(g) regulating any other matter relating to the conservation, protection and maintenance of a stock of fish which may be deemed requisite.
(Section amended by 7 of 1966, 17 and 22 of 1977, s2)

Native Fisheries Commission

14. The Minister responsible for Fijian affairs may appoint a Native Fisheries Commission (hereinafter referred to as the Commission), consisting of one or more commissioners, each of whom shah have the powers of the Commission, who shall be charged with the duty of ascertaining what customary fishing rights in each province of Fiji are the rightful and hereditary property of native owners, whether of mataqali or in whatsoever manner or way or by whatsoever divisions or subdivisions of the people the same may be held.
(Amended by 37 of 1966, s.50 and 112 of 1970)

Inquiry by Commission

15. (1) The Commission shall institute inquiries into the title of all customary fishing rights claimed by mataqali or other subdivisions of the people, and shall record in writing the boundaries and situation of such rights together with

the names of the respective communities claiming to be owners thereof.
(Amended by 8 of 1951, s.3)

(2) The Commission shall with the approval of the Minister responsible for Fijian affairs make rules for regulating the procedure to be followed and prescribe forms to be adopted in any such inquiry.
(Amended by 112 of 1970)