

Harnessing the Traditional Ecological Knowledge of Subsistence and Artisanal Fishers For Conservation Solutions in a Fijian Fishing Village

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Introduction

Tropical coral reefs and the fish that inhabit them are under significant threat from ocean acidification, habitat destruction, and overfishing. Like many South Pacific cultures, the Republic of Fiji possesses a unique system of traditional reef management by which local communities possess legal tenure over small areas of the inshore reef, known as *qoliqoli*. This means that villagers can monitor who exploits their fishing grounds and take measures to prevent overfishing and the so-called “tragedy of the commons.” Research has shown that marine protected areas (MPAs) that take into account such traditional management practices of local communities are more effective at preserving threatened populations of reef species. Residents of Nagigi village in Fiji have expressed interest in establishing a marine protected area (MPA) on a portion of their local reef. The purpose of this study was to poll villagers about their fishing practices, which species they targeted most heavily, and aspects of their traditional ecological knowledge (TEK) might have bearing on the establishment of a conservation program. In addition, village support for the MPA proposal and suggestions for program length and location were assessed.

Research Questions

1. What are the general characteristics of men and women’s fishing in Nagigi?
2. What species are most heavily targeted by villagers, and therefore at risk for overfishing and population collapse?
3. How do villagers perceive that their reef environment has changed throughout their lives, and what do they understand to have caused these changes?
4. What conservation measures do villagers support to halt and reverse any negative impacts they have observed?

Methods

I spent four days between June 28 and July 3 in Nagigi village conducting interviews with male and female fishers (Figure 1). I obtained consent from my participants in accordance with Columbia IRB policy and worked with an IRB-approved questionnaire (Proposal IRB-AAAL4860), but modified it as necessary to work in different contexts. Interviews took place in participants’ homes, while reef gleaning, and while drinking kava (a Fijian social ritual centered around a mildly narcotic drink made from *yaqona* root). I worked with three male translators; out of 22 participants, 9 spoke English well enough that we communicated without a translator. Interviewees had an average age of 50 and had spent 44 years in Nagigi village on average.



Fig. 1. Conducting an interview while net fishing at low tide inside the proposed marine protected area.

Abstract

Fiji possesses a unique system of traditional reef management in which local clans, or *matangali*, control individual units of a reef, known as *qoliqoli*. Under this system, village leaders can make the decision to temporarily ban fishing on portions of a *qoliqoli* in response to overfishing and other causes, thus helping to maintain a healthy reef ecosystem over many generations. This system, known as customary marine tenure (CMT), has attracted interest from conservation scientists hoping to set up marine protected areas (MPAs) on vulnerable tropical reefs. It has been shown that MPAs that incorporate traditional beliefs about reef tenure are generally more successful in reaching conservation goals and ensuring the participation of local fishermen. As one example of this grassroots participation, Nagigi village on Fiji’s northern island has expressed interest in setting up an MPA in part of its *qoliqoli* in response to concerns about overfishing. I went to Nagigi to interview fishermen and -women there about their fishing practices, conservation concerns, and opinions regarding the proposed MPA. I found 100% approval of the MPA proposal, with participants suggesting a duration between 1 and 10 years. Reef degradation concerns included fishing for “quick cash,” village-level population growth, and the impacts of night fishing. I suggest an MPA of at least 3 years based on the life histories of heavily targeted species and a possible partnership with the nearby Koro Sun dive resort to explore tourism options for the village.

Results

Fijian Name	Scientific Name	Number of Mentions	Perceptions of Pop. Change
Kuita	<i>Octopus</i> sp.	8	Declining size (n=1) and abundance (n=3)
Kabatia	<i>Lethrinus harak</i>	6	Decreasing abundance (n=1)
Saqa	<i>Caranx ignobilis</i>	6	Decreasing abundance (n=1)
Kanace	<i>Moolgarda engeli</i>	6	Smaller, scarcer, and harder to catch (n=1)
Ulavi	Gray or white parrotfish larger than 30 cm	5	Increasing abundance (n=1)
Vonu	Sea turtles	5	Decreasing abundance (n=2)
Labe	<i>Halichoeres trimaculatus</i>	5	N/A
Nuqa	<i>Siganus vermiculatus</i>	5	Decreasing abundance (n=1) or increasing abundance (n=1)
Kawakawa	<i>Epinephelus polyphkadion</i>	4	Decreasing size and abundance; increased fishing effort necessary (n=5)
Ta	<i>Naso unicornis</i>	4	N/A
Tabace	<i>Acanthurus triostegus</i>	4	N/A
Dridri	3 <i>Acanthurus</i> sp.	4	Increasing abundance (n=1)
Vasua	<i>Tridacna gigas</i> (sea clams)	4	Decreasing abundance (n=1)
Deou	<i>Upeneus vittatus</i>	4	N/A

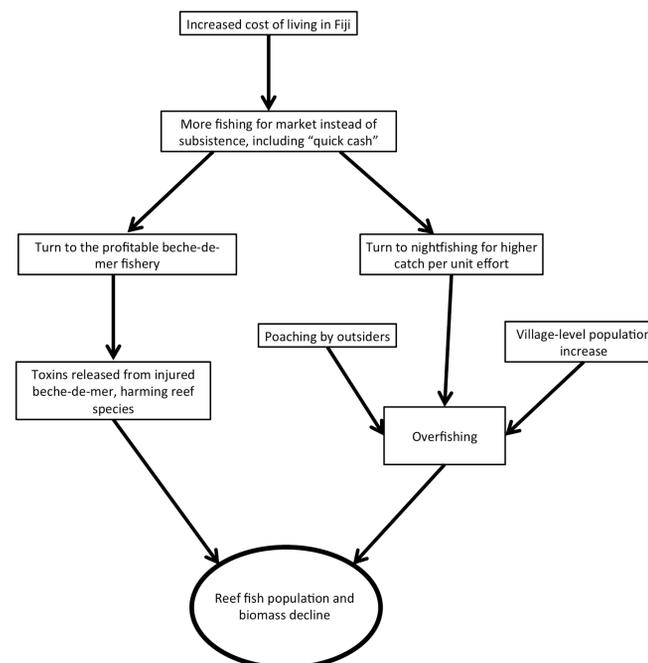


Fig. 2. Villagers cited an interlocking complex of socioeconomic factors thought to contribute to reef degradation. These include poaching, the increased cost of living in Fiji, and the profitability of harvesting beche-de-mer (sea cucumbers, *Holothurian* sp.)

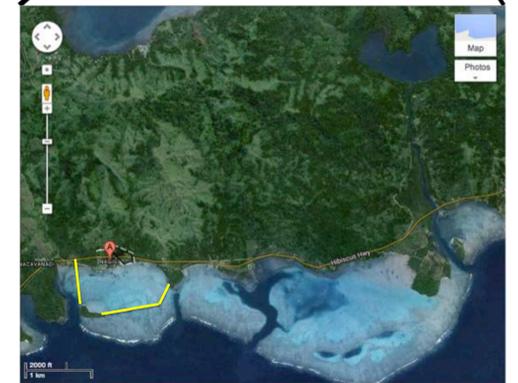
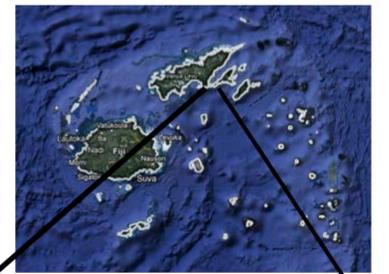


Fig. 3. Map of Fiji with inset showing the village of Nagigi (red flag) and the proposed marine protected area (yellow outline).

Discussion and Recommendations

Participants cited an interlocking set of economic and social causes for fish population and biomass decline that included the increased cost of living in Fiji, increased fishing for income vs. subsistence, poaching by outsiders, and a village-level population increase (Fig. 2). To remedy this overexploitation, they suggested a small MPA lasting between 1 and 10 years. Several heavily targeted species do not reach sexual maturity until age 3-5, so I would press for villagers to make sure an MPA lasts at least longer than 3 years. The area suggested for Nagigi’s MPA is only 1 km², which research indicates is not large enough for mobile species like *Lethrinus harak* (Fig. 3).



Lethrinus harak, matures at 3-4 yr (males)



Caranx ignobilis, matures in 3.5 yrs



Chelonia mydas, matures in 30 yrs



Siganus vermiculatus, females mature at 1 yr

References

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