

PROJECT PROFILE



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Introduction

Extending along the Southwest coast of Madagascar, the Toliara Barrier Reef Complex is a highly-productive marine turtle foraging ground associated with the migratory routes of many of the turtle species found within the region (Rakotonirina & Cooke, 1994). However, little is known about the spatiotemporal variations in occurrence, nor the demographics of the turtle population frequenting this important foraging ground of the southern Mozambique Channel.

Since its foundation in 2001, ReefDoctor, a UK marine conservation NGO, has been stationed in the Bay of

Ranobe (BRB). Located 25km north of the regional capital of Toliara, the BRB is a semi-enclosed lagoon and a sub-section of the Toliara Barrier Reef Complex, supporting diverse marine habitats including coral reefs, seagrass meadows, and mangrove forests (Figure 1).

Indigenous communities are divided into three ethnic groups and/or tribes; Vezo – marine foragers, Masikoro - cattle herders and farmers, and Mikea - hunter gatherers. The extreme poverty of this semi-arid region (Tucker, 2012; Cavendish, 2000; Reardon & Vosti, 1995) has resulted in resource over-exploitation (Gore *et al.*, 2013) and severe habitat degradation.

As specialist marine foragers, the Vezo obtain approximately 84% of their income from the near shore marine environment (Tucker *et al.*, 2010). Nonetheless, primitive fishing technology, such as dugout canoes equipped with one outrigger and a sail, restricts the distance from shore fishermen are willing to travel. Similarly, sea-state and weather restrict fishing days, resulting in periodic food shortages (Tucker *et al.*, 2010).

For centuries Vezo communities have exploited marine turtles (Lilette, 2006; Frazier, 1975; Louvel *et al.*, 1927), which are considered to hold intrinsic spiritual, economic, and subsistence values (Eckert, 1999; Frazier, 1976, 1980; Muir, 2005). In terms of spiritual value, local communities believe it to be beneficial for their families to perform the ritualistic sacrifice of these animals, acting as a form of ancestor worship (Lilette, 2006) that results in the obligatory consumption of the turtle meat (Cinner, 2007). In addition, turtle eggs are targeted for trade by the Vezo as a food item, and turtle oil is used in traditional medicine (Rakotonirina & Cooke, 1994). In 1923, legislation was put into place for the protection of marine turtles in Madagascar in prohibiting the capture of nesting females and individuals with a carapace diameter of less than 50cm (Decree 23; Louvel *et al.*, 1927). In 1975, Madagascar ratified the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora (Decree 75-014), and in 1988, Decree 88-243 prohibited the exploitation and sale



Figure 1. Bay of Ranobe, sub-section of the Toliara Barrier Reef Complex, Southwest Madagascar

of marine turtles throughout Madagascar. However, whilst the decrees provide protection to marine turtles at a national level, nationwide enforcement is weak, or even non-existent, due to the lack of financial resources available to enforcement officials.

Despite the lack of government-led enforcement of national laws, in rural areas around 75% of governance takes the form of distinct social codes and pre-established rules, which are conveyed principally in the form of oral traditions passed down from one generation to the next (Ratsimbazafy *et al.*, 2013; Pollini & Lassoie, 2011). Whilst the ritualistic consumption of turtle meat by the Vezo may have been sustainable in the past, it is now evident that the capture, trade, and sale of turtle meat is becoming much more commonplace. With the erosion of the cultural value of turtles and emphasis being placed on their economic value, undoubtedly greater-and-greater exploitation pressure will be placed on these already fragile marine turtle populations.

Project objectives

In 2008 ReefDoctor, with sponsorship from the Rufford Small Grants Foundation, pioneered an innovative conservation approach to protect marine turtles of the BRB region. Integrating fisheries management strategies and grassroots, community-based conservation initiatives provided a foundation for the Vezo community to develop their own approach towards the sustainable exploitation of marine turtles. The project hopes to promote this through (a) collating ethnographic information to assess patterns of turtle-human interactions (b) an evaluation of the marine turtle fishery through the collection of biological data on the capture and consumption of marine turtles in the BRB and, (c) the development of the first marine turtle protection association whose core members are Vezo turtle hunters.

Our scientific objectives are:

Research and Monitoring as a tool for securing conservation

- Developing tools for structured decision-making to support adaptive environmental management of the Bay of Ranobe (BRB)

Evaluation of marine turtle fishery - direct hunting and incidental capture of the globally important, yet understudied marine turtle population of the BRB.

- Collection of biological data on the capture and consumption of marine turtles in the BRB

Implementation of community-based conservation

fisheries management strategies, policies and local indigenous laws (dina) related to conservation and sustainable use of marine turtles and their habitats

Capacity building of rural communities

- Exit strategies for fishers; adult education and training in alternative livelihoods to promote self-fulfilment of rural young people, to develop entrepreneurship spirit and to encourage personal risk and initiative taking.
- Institutional integration; building a network connecting rural communities with local, national and international institutions.

Public awareness

- Delivering an innovative working model and platform for marine turtle conservation throughout the Western Indian Ocean.

Project result

Since the launch of this project over 1500 marine turtles have been captured and slaughtered in the Ranobe region. The green turtle (*Chelonia mydas*), constitutes 97% of the fishery although all five species of marine turtle, present in Madagascar waters, are targeted. Hawksbill turtles (*Eretmochelys imbricata*), loggerhead turtles (*Caretta caretta*), olive Ridley turtles (*Lepidochelys olivacea*) and leatherback turtles (*Dermochelys coriacea*) are only occasionally caught.

Estimates of annual income derived from marine turtle products indicate an increase from £3,000 in 2009 (£2.60 per kg) to £6,900 in 2012 (£3.60 per kg). Over the same time period, average straight carapace length has decreased, in green turtles, from 78 cm in 2009 to 69 cm in 2012. The capture of large individuals has become rare.

A community conservation effort has evolved through a grassroots movement by turtle hunters to protect their identity, and livelihood, through the protection of marine turtles. The group Fikambanana MPaniriky Miaro ny Fano (FI.MPA.MI.FA)- the first grassroots marine turtle management association in Madagascar was recognised as a legal association by the Malagasy government in 2012. Focusing on reducing the illegal exploitation of marine turtles in the Bay of Ranobe, the Association seeks to use indigenous knowledge to develop a practical fisheries management framework. Earlier this year the first 'dina', or traditional law, preventing the hunting of turtles under 70 cm, was implemented throughout thirteen communities, with an estimated population of over 20,000 people. Each of the thirteen communities of the BRB have formed turtle

protection teams composed of elders and fishermen, who are responsible for the administration of the dina. These teams are largely reducing conflict and providing a platform for marine turtle protection in the region.

In September 2013, ReefDoctor Fano (marine turtle) project and FI.MPA.MI.FA teamed up with Kelonia marine observatory in Reunion. The objectives of this partnership are to implement the first community-based tagging program of juvenile turtles in South-west Madagascar. Juvenile marine turtles under 70 cm CCL, protected by the newly established dina created by FI.MPA.MI.FA, are tagged and released by the association. The first juvenile turtle to be protected by the dina was delivered to the association on 5 October 2013. The 47 cm CCL female was tagged by ReefDoctor's community turtle officer and released by the president of FI.MPA.MI.FA.

Future research

The challenge, over the next few years, for the ReefDoctor marine turtle project is to describe the structure of the marine turtle population inhabiting the reef complex of Toliara. This will require an estimation of stage and population-specific partitioning of habitat use, age at maturity, and seasonal and ontogenetic shifts in habitat occupation. This will be attained through:

- Stomach content analysis; to determine habitat use and diets of juvenile and adult marine turtles.
- Urogenital analysis; evaluating the reproductive stage, age, and size at reproductive maturity of marine turtles exploited in the fishery.

For further information on the ReefDoctor FANO (marine turtle) project please contact emma@reefdoctor.org.

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OLIVE RIDLEY PROJECT: ACTIVELY FIGHTING GHOST NETS IN THE INDIAN OCEAN

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Introduction

The Olive Ridley Project was initiated in response to large numbers of olive ridleys turtles (*Lepidochelys olivacea*) found entangled in fishing nets in the Maldives. This species of sea turtle is rarely observed in the Maldives; however, since 2011 marine biologists, dive masters and boat captains have recorded 47 olive ridleys entangled in fishing nets. The recorded entanglements have occurred through chance encounters suggesting the data only reflects a small proportion of the actual number of ghost net entrapments of olive ridleys in this region. Since the inception of the Olive Ridley Project in July 2013 a further 20 olive ridleys have been found. Often turtles spend extended periods of time entangled in nets and their condition quickly deteriorates. Dehydration, amputations and deep lacerations are some of the injuries sustained. The risk of predation by opportunistic predators increases when entangled and defenceless and this brings with it further trauma to the turtles. Once found, their condition can be so severe that often they do not survive. Dedicated teams in the Maldives, Sri Lanka and India are working towards rehabilitating injured turtles, but the problem continues.

Net fishing techniques

Unfortunately artisanal and commercial fisheries

surrounding the Indian Ocean rely heavily on fishing nets. Net fishing bycatch is difficult to accurately estimate as records are absent or poorly kept (Amandè *et al.*, 2010) but is thought to be responsible for ecological effects on key species such as turtles, sharks, rays, mammals and other marine organisms that are relevant to ecosystem structure and function (Garcia *et al.*, 2003).

Population growth leads to increased competition for natural resources throughout the world. Artisanal fisheries have to compete with large commercial fisheries and each other for healthy catches, which often leads to travelling greater distances and illegal fishing activity. Trawling, seine and gill netting methods make up the different techniques practiced in the Indian Ocean.

Fishing nets made of nylon are easily broken. Some communities in Sri Lanka use nets for only 6 days before they become too damaged and need to be replaced (M. Stelfox 2013, pers.comm., 10 November). In addition nets often become entangled on the sea floor during use and removal becomes almost impossible. Net fishing is not only unsustainable but when discarded at sea the nets remain very effective long after use. They are also very expensive for the fishermen and communities waste a significant amount of money replacing lost or damaged nets (M. Stelfox 2013, pers.obs.).