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Blue Ventures Conservation Andavadoaka, Madagascar

Velondriake's first coordinated network of octopus no-take zones reopen, destructive fishing methods challenged in Bevato and Rodriguan fishermen visit Andavadoaka to learn about the establishment of community-led marine protected areas.

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Research Update, January to March 2009 *Edited by Sean Clement*

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2009 Octopus no-take zone openings build capacity for community led resource monitoring

February 25th 2009 marked the end of the first coordinated temporary fishery closures in the Velondriake community-managed marine protected area (CMPA) in southwest Madagascar. Twelve community-selected no-take zones (NTZs), based around reef-flat habitats throughout Velondriake, were reopened to fishers after a three-and-a-half month closure to octopus fishing.

Mother and child preparing to glean for octopus on the reef flats near Andavadoaka village.

Octopus is the most economically-important fishery in Velondriake, accounting for over half of fisheries-derived revenue. Trials of different management techniques, involving temporary closures and NTZs, have been pioneered by Velondriake's coastal villages since 2004. The 2009 opening represents several important firsts for the Velondriake project. This year was the first time so many openings have been attempted, with eight new NTZ sites added since 2008. 2009 has been the first year that multiple closures have been attempted in the austral summer months as an extension of the regional octopus fishery closure, which takes place from 15th December to 31st January, to protect the prime breeding season for octopus. Finally, it was the first time that all the reserves were timed to open simultaneously. This was a strategy aimed at reducing "free-riding", or opportunistic fishing in newly-reopened NTZs by itinerant visitors eager to share in the fisheries benefits of a newly-reopened reserve. The addition of so many new NTZs throughout the Velondriake area illustrates the growing popularity of the NTZ as a resource management tool amongst Vezo fishing communities. The approach, first proposed by Blue Ventures scientists in 2005, has since been shown to lead to the recovery of octopus populations as well as to an increase in the average size of individual octopus. The successful synchronisation and coordination of this year's NTZ closures and reopenings illustrates the extent to

which the Velondriake committees are now able to respond quickly to management problems and find creative solutions that garner widespread support for conservation.

Local fisheries monitoring staff, trained by BV scientists, collected detailed data on the octopus catch before and after the openings, as well as data on average fishing effort by local fishers. These data are being analysed to help determine more precisely the biological and economic impacts of the reserves.

While the 2009 reserves were widely regarded by local communities as a success, several new problems also presented themselves. The first was caused by the political crisis affecting Madagascar throughout February and March. This year's opening was originally scheduled to occur in the first week of February. However, due to logistical and communications problems, the regional fisheries collection companies were unable to collect any produce until February 25th. Information of the unexpected 3-week delay filtered through the difficult communications channels to these remote villages, most of which are out of mobile telephone reception and depend on fishermen to relay messages up and down the coast. This last minute change of plan inevitably led to confusion in local villages as to when the reserves would reopen.

Some fishers took advantage of the confusion by disregarding the rescheduled opening dates and fishing from the reserves before they had been reopened. While many villages were able to respond quickly to stop rule-breakers, a few villages lost a considerable amount of catch to theft before the openings. Unfortunately from a monitoring perspective, this stolen catch was mixed with the legal catch, making it difficult to precisely determine how much catch was lost from the reserves before the opening. However, anecdotal evidence suggests that as much as 30% of total catch may have been lost in some villages, especially in NTZs in the southern Velondriake region.

Vezo family weigh up the day's octopus landings.

Another challenge that occurred with the reopening of this year's reserves was the occurrence of an unusually high tide on the reopening day. Following the long delay in collectors' arrival, communities selected an alternative opening day. However, the day chosen was two days before true low tide. The result of this decision was that many women, who account for a large proportion of fishing effort, were unable to glean for octopus by walking across the shallow reef flats. Given the higher water level it was necessary for fishers to dive, a method that is generally restricted to male fishers. Thus many women, being restricted to only the shallowest fishing areas, lost out on opportunities to share in the reserves' benefits. While some of the areas inaccessible to women proved highly profitable to male fishers, equipped with masks and accustomed to diving, many of these deeper areas remained largely unexploited on the reopening day. These areas continued to be highly productive for several days after the reopening, as the arrival of the low tide made them more accessible.

It is important for Velondriake's management committees that experiences such as this are fed back into management and decision-making processes in order to guide further activities appropriately. So far, the experiences of 2009 highlight the need for a community-managed monitoring system, which can input scientifically valid and community-recognised feedback into the management system. Community-based scientific monitoring of fisheries and marine ecosystems has been pioneered successfully outside Madagascar and is currently being developed by Blue Ventures for the Velondriake CMPA. Several teams of community volunteers have already completed preliminary surveys of locally-important fisheries and coastal habitats both within and outside Velondriake's protected zones.

Velondriake's community-based monitoring programme aims to establish a simple, sustainable monitoring system that the community can implement independently of outside technical or financial support. Blue Ventures is working with Velondriake to ensure that data collection is rigorous and sustainable in the long-term, data are analysed properly and disseminated back to the communities and the results inform management actions.

Vezo use traditional spear fishing methods when gleaning for octopus.

For the remainder of 2009, in addition to the new participatory resource monitoring program, Velondriake aims to launch nine new

permanent marine reserves (parks) which will conserve important coral reef habitats. A Velondriake information and visitor's centre is due to be constructed, to act as a training focal point for eco-guides who will pioneer eco-tourism activities in the region starting in the coming winter tourist season.

Increasing use of destructive fishing techniques by migrant fishers

Beach-seining is a fishing technique that involves the movement of a large, fine-mesh net along seagrass beds and shallow in-shore areas near the edges of patch reefs. The net can cause considerable damage to fragile seabed communities, and its unselective fine mesh size means that all caught fish are removed from the habitat – including juveniles and species that have no commercial or nutritional value. Consequently the technique is considered to be a physically destructive and highly unsustainable practice, often causing long-lasting damage to lagoon and reef ecosystems. Within Velondriake the technique is prohibited by local law, or "*Dina*".

However, the practice is still used on occasion, mainly by migrant fishermen from inland areas. Coastal resources in southwest Madagascar have historically attracted large numbers of migrants from the interior of the country, seeking alternatives to diminishing returns from overworked farmland. Lacking the sailing skills and experience of the Vezo fishermen, these migrants commonly use the relatively simple technique of beach-seining to earn a living from the sea, selling the majority of their catch to be used as livestock feed and keeping the remainder for food. The proliferation of these methods throughout the migrant fishing community presents major challenges to the enforcement of Velondriake's *Dina*.

Beach seining being used in Andavadoaka, prior to the development of the Velondriake community-run marine protected area.

These challenges have recently come to the fore in the village of Bevato, located at the northern margin of Velondriake, 10km south of the town of Morombe. Morombe has a large population of migrant fishermen who commonly employ beach seine fishing. Bevato has recently become home to a population of approximately 70 migrant fishermen with fishing gear and pirogues. Mindful of the laws surrounding beach seine fishing, local residents made repeated requests to the migrant fishermen to abstain from using their methods. These requests were ignored, resulting in conflict developing between Bevato and its migrant population. Samba Roger, President of the Velondriake committee, was asked to intervene with the mayor of Befandefa commune, the local government district into which Velondriake falls.

A meeting was convened at the beginning of March between the Velondriake committee, the mayors of Morombe and Befandefa and representatives from the migrant fishermen, to explain the importance of the *Dina* to supporting Vezo livelihoods in Velondriake. Following the meeting, the migrant fishermen agreed to adhere to the *Dina* and put this agreement into writing, signed by all parties. A formal invitation to participate in future Velondriake meetings was also issued to the representatives of the fishermen.

Two weeks after this meeting, a full Velondriake committee meeting, representing all 24 of Velondriake's villages, was held in Bevato in a display of support for the Bevato villagers and to encourage attendance by the migrant fishermen.

Obtaining agreement from migrants to abstain from destructive fishing practices within Velondriake is only a first step to overcoming this resource management challenge. Velondriake's management committees must now find new and creative solutions to the beach-seining problem whereby villagers can clearly and strongly reject beach seining, without necessarily expelling the fishermen who practice it. In this way, productive win-win solutions which target the root of the problem can be achieved.

Blue Ventures is now trialling a beach-seine buy-back gear exchange programme, whereby beach seines are purchased from fishermen in return for provision of less damaging gear-types. The results of these trials are being monitored to assess whether this intervention can be effective in bringing about the behaviour change necessary to satisfy the Velondriake's communities as well as the needs of migrant fishermen.

Velondriake committee provides guidance to Rodriguan fishermen in bid to establish own community-run MPA

In late January a group of fishermen from the island of Rodrigues travelled to Velondriake to learn from local fishermen and Blue Ventures how they could create and manage their own marine protected area (MPA). Rodrigues is a small island, 650 km east of Mau-

ritius, with a population of approximately 40,000. This exchange of experiences and ideas with the Velondriake committee inspired the fishermen to establish three trial octopus reserves on their return home.

The exchange took the form of a four-day workshop led by the Velondriake committee with Blue Ventures providing technical assistance where needed. Similar exchanges have previously taken place between the Velondriake committee and Vezo villages located further south and had resulted in the establishment of a number of successful octopus NTZs based on the Velondriake model.

The Velondriake committee members explained how they had established the Velondriake network and how they were successfully managing it. In doing so they demonstrated which natural resource management problems they have been faced with, both in general and with the octopus fisheries. They recounted the history of the octopus NTZs, from the pilot scheme on Nosy Fasy to the present day management regime; and how this led onto the creation of a full MPA. This step-by-step introduction demonstrated to the Rodriguans how a local community had successfully managed their marine natural resources. Using the octopus NTZ scheme as an example, the Velondriake committee and their guests explored the interactions between marine resources and those that use them. By demonstrating how establishing permanent and temporary NTZs has had a positive effect on octopus stocks in the area, the links between the management of a resource and its productivity were made apparent. The Velondriake committee also recounted how the outlawing of destructive fishing practices, such as poison fishing and beach seine fishing, can also improve the health of a resource.

Providing an overview of Velondriake, the committee explained the details of the network's creation and the day-to-day aspects of running and maintaining it. Explanations were provided as to how the community – themselves - had established and enforced the legislation surrounding the MPA, how they had selected temporary and permanent NTZs, how they had established channels of communication with local and national authorities, and how they were monitoring their natural resources using participative approaches.

Blue Ventures scientist, Daniel Raberinary, delivers a lecture to Rodriguan fishermen.

Georgi Robinson, Mariculture Development Coordinator, presented a lecture on seaweed and sea cucumber aquaculture in Velondriake and how they can form viable alternative livelihoods to fishing. She explained the technical aspects of establishing these projects, in particular, how Blue Ventures had enabled villagers to successfully grow-out *Holothuria scabra* to adult size from hatchery-sourced juveniles in family-owned enclosures.

Leaders of Velondriake led the Rodriguan fishermen in field visits to Lamboara and Tampolove, where they were able to see a selection of octopus NTZs, a permanent NTZ site and the turtle nesting beach that Lamboara has protected, demonstrating the tools of marine resource management in action. During these field visits they were also able to engage with local communities to gain a better understanding of the effects that these conservation tools have had and how they are managed 'on the ground'.

On the final day the Rodriguans carried out a practical exercise to relate what they would have to do to achieve successful NTZs on their return. This included: establishing a democratic community-based organisation; selecting suitable sites for NTZs; establishing the rules of the NTZs through wide consensus and enforcement; and the importance of monitoring the NTZs. Members of the Velondriake committee helped them based on their own experience, giving practical advice and suggestions.

Conservation workshop with members of the Velondriake Committee and their Rodriguan guests.

At the close of the exchange, the Rodriguan fishermen had developed a clear objective to work towards upon their return to Rodrigues: to establish three temporary octopus NTZs to be closed for a period of three months to allow unhindered juvenile recruitment onto the reef flat. They also spoke of their desire to develop a network similar to Velondriake and that they were now aware of the tools necessary to make it happen. They were able to return with a clear plan as to what they wanted to do and how they were going to achieve this with the community.

Investigating seaweed mariculture as a alternative livelihood for Velondriake inhabitants

In January, Georgi Robinson visited the small island of Nosy Ankao in northeast Madagascar to gain an insight into seaweed farming technologies used by IBIS Madagascar. IBIS is the only major producer of cultivated seaweed in Madagascar, currently exporting 1,400 tonnes of dried seaweed per annum to one of the world's largest buyers, FMC Biopolymer. IBIS farms two species of red seaweed, *Kappaphycus alvarezii* and *Eucheuma denticulatum* - more commonly known as 'cottonii' and 'spinosum' – that have an export value of US$650 and US$300 per tonne respectively. These seaweeds are commercially valuable for their carrageenan content, a polysaccharide that is used as a gelling agent and emulsifier in a range of common food and cosmetic products, such as beer, ice cream and toothpaste.

Cottonii and spinosum stands in shallows off Nosy Ankao.

The visit to Nosy Ankao was organised in light of a new partnership involving IBIS, the fisheries export company *Copefrito*, Blue Ventures and a local NGO, Trans-Mad (TMD), with a view to transferring the technology for seaweed farming to southwest Madagascar. The aim is that IBIS will provide technical expertise to Blue Ventures to develop seaweed nurseries and train local communities in seaweed cultivation techniques, and will support Copefrito with commercialisation through sale to their client FMC Biopolymer. The partnership has all the key elements for success, combining public and private stakeholders in a collaborative venture that has the potential to rapidly replicate the seaweed farming success of Nosy Ankao.

The trip, hosted by IBIS and funded by Copefrito and each partner NGO, was intended to provide an overview of the entire seaweed production cycle from cultivation and processing through to export. Representatives from Blue Ventures and TMD spent a week on Nosy Ankao to gather information on all of the production stages, from developing the first seaweed nursery and demonstration farm to scaling up the technical support and infrastructure necessary to achieve commercial production. During the week they visited the seaweed production sites and talked to farmers and technicians to learn about the species farmed, production cycles, culture techniques and social organisation. This knowledge will prove invaluable in order to transfer and adapt seaweed farming technology to local environmental and socio-economic conditions and establish it as a key aquaculture industry in southwest Madagascar.

The situation in Nosy Ankao is unique compared to other places in Madagascar, and a whole community has developed centred around seaweed farming. Prior to the arrival of IBIS, the island was only inhabited by migrant fishers. Presently there are 230 people living on the island for which seaweed farming is their principal activity. The farmers should strictly be classified as 'migratory or temporary workers' as they arrive on the island with virtually no possessions with a view to earning enough money from seaweed farming (2-3 years) before returning to their place of origin. Although IBIS and its project partners have invested heavily in social development and environmental awareness - including the construction of wells, water towers, rubbish bins and an incinerator, a plant and tree nursery, a school and a resident doctor - the number of people that can potentially farm seaweed for IBIS is limited by the carrying capacity of the island in terms of space and access to fresh water.

Satellite image of Nosy Ankao (source: Google Earth).

The majority of people on the island are individuals, couples or small families; however, even couples are treated as individuals and each given their own area to farm seaweed. Seaweed farming is based on vegetative reproduction with a grow-out cycle between seeding and harvesting of six weeks. Although a number of innovative farming techniques introduced from the Philippines, such as rock farming and net farming, are being trialled on Nosy Ankao, the main culture technique is the traditional 'off-bottom' method. The technique consists of 10m long culture ropes suspended between 2 stakes about 50cm above the ground. Seedlings are fixed onto the culture rope at 50cm intervals using a labour-saving system of "made-loops". Farms are organised into production units with ten culture lines per unit. The majority of farmers operate be-

tween 25 and 30 units which permit them to produce on average 480kg of dried cottonii per month with an approximate value of US$65.

Harvested seaweed being dried prior to export.

As the Philippines and Indonesia account for over 90% of the world's production of cottonii and spinosum, there is a pressing need for multinational corporations such as FMC Biopolymer to diversify their source countries and spread the risk posed by natural disasters. In the Western Indian Ocean, Tanzania, Zanzibar and Mozambique are the main seaweed producing countries. For these nations, seaweed farming has become an established aquaculture industry that is a significant export earner and a sustainable alternative livelihood. In southwest Madagascar where fishing is the main occupation for over 70% of the population, resource decline, habitat degradation and climate change are currently threatening fishermen's livelihoods. For Vezo fishing communities, alternatives to marine resource extraction are severely limited due to the isolation and aridity of the region and their innate dependence on marine resources. The transfer of technology from Madagascar's main seaweed producing company offers a means not only of expanding Madagascar's seaweed industry but alleviating poverty by providing lasting employment and income for Vezo communities in southwest Madagascar.

Blue Ventures scientists take part in IUCN reef resilience survey

Climate change is now recognised as one of the greatest threats to coral reefs worldwide, and while a changing climate brings many challenges to coral reefs, one of the most serious and immediate threats is from mass coral bleaching associated with unusually high sea temperatures. Coral bleaching has lead to substantial damage to coral reefs on a global scale, and the reefs of Madagascar are no exception.

Resilience is the ability of a coral/reef to recover from stresses such as bleaching and has been linked to a number of natural biological and physical factors, as well as human influences. The target of MPAs is to reduce 'manageable' stressors, such as overfishing, enabling the ecosystem to be better able to deal with larger-scale threats, such as increasing sea temperature.

In March 2009, the Blue Ventures science team was contracted to carry out surveys within the Velondriake MPA region using new reef resilience assessment techniques, developed by expert IUCN reef scientist, David Obura. This new methodology not only assesses the current status of the reef but also looks at past mortality events, providing a comprehensive overview of the stresses on each reef site from temperature, visibility, depth, topographic complexity, sediment impact and anthropogenic influence on water quality.

The method is being implemented on reefs throughout the Western Indian Ocean (WIO) and was recently completed in Nosy Hara in the north of Madagascar, in November 2008. The IUCN-led project aims to provide scientists with an insight into the resilience of the reefs within the WIO region and ultimately identification of priority areas for conservation.

The main aim for carrying out this work within Velondriake is to ensure the inclusion of those reefs that exhibit greatest resilience in the face of natural and anthropogenic pressures within the MPA management plan.

The dive team was trained at the beginning of March and are scheduled to survey between 15 to 20 reef sites over the following three months. Reef sites to be surveyed were carefully selected to ensure that sufficient variation in reef dynamics will be incorporated.

Despite Blue Ventures extensive knowledge of the local reefs, the results of this project may yet surprise us, and it will be interesting to compare the resilience of the reefs within Velondriake with those of reefs elsewhere in Madagascar and the wider WIO.

Family planning workshops spread throughout Velondriake

When a pirogue pulls up to any given village in Velondriake, children appear in large numbers to greet the new arrivals. There may be fewer than 15 huts sitting on a sand dune and searching for the few adults at home or at work in their boats may take time. Children, however, are visible, audible and plentiful.

Central family planning is becoming increasingly recognised as a vital part to any development strategy. Conservation, the economy and education are all connected to birth rate.

Blue Ventures has recognised these links and is taking action to address the need for access

to contraceptives with proper family planning counselling. A weekly family planning clinic was opened in the village of Andavadoaka in 2007 and promoted throughout the region. However, patient interviews showed that people only from the closest four villages were using the clinic and benefitting from the affordable contraceptives.

There is a huge lack of awareness on contraceptives in the rural region of southwest Madagascar and is indicative of just how isolated the population is. There is a single basic health clinic 15 km inland, but family planning ranks low on the priority list of the solitary doctor working there to serve the needs of over 10,000 people.

In order to help increase awareness and the opportunity for men and women to have access to advice and family planning, fourteen women from Andavadoaka completed training to learn about available contraceptives, signs and prevention of sexually transmitted infections (STIs) and HIV/ AIDS in March this year. They developed skills in public speaking and peer counselling in preparation for a tour to each village in Velondriake where they will hold gender specific community meetings to discuss the benefits of family planning and STI awareness with their peers. These meetings will serve to inform communities, advertise the clinics and establish these women as local authorities, available to be consulted in the future.

Many of these women have used some form of birth control themselves. They are able to share experiences and compare side effects of each method with women and help to reduce any rumours and myths attached to certain treatments. These peer educators are of a range of ages and speak to the specific needs and interests of their age group.

It is planned that in April and May of this year, two additional weekly satellite clinics will be opened in the village of Belavenoke in the north, and in Tampolove in the south, to serve those populations too far from Andavadoaka to benefit from the first clinic.

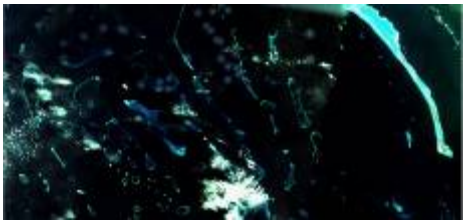
With three clinics a week, the Blue Ventures sexual and reproductive health project hopes to offer services to villages throughout Velondriake and provide people with access to birth control and assistance in developing responsible birth plans.

Red Sea reef exploration

Blue Ventures recently took part in a landmark marine research expedition in the southern Red Sea. Throughout April, an international coral reef research team based on board the Golden Shadow, a research vessel operated by the Living Oceans Foundation, explored the Farasan Banks, an extensive reef system that had not been scientifically surveyed since Jacques Cousteau visited the area in the 1950s. Captain Cousteau's 1953 book, *The Living Sea*, describes the remote banks as the wildest of all reef complexes in the Red Sea.

Expedition research vessel MY Golden Shadow.

The expedition's aim was to characterise the health of this vast and largely unknown reef system, which extends for approximately 450 km from north to south and 50 km from east to west, up to 100 km off the southern Saudi Arabian coast. BV research director, Alasdair Harris, joined the team conducting benthic coral reef assessments, with emphasis on the diversity, abundance and size structure of reef building corals. Al's work built on previous surveys carried out by the Living Oceans Foundation expeditions at sites further north in the Red Sea. BV scientific advisor, Dr. Sam Purkis, also took part in this groundbreaking research voyage, leading ground-truthing and habitat characterisation efforts.



Satellite image showing bewildering networks of coral reefs in the Farasan Banks, southern Red Sea.

The Farasan banks exhibit truly spectacular structural formations, consisting of complex networks of submerged reef pinnacles, often plunging vertically to abyssal depths. Their structure is the result of complex geomorphological processes operating over geological time. Sam's work employed the use of acoustic sediment profiling techniques to begin to characterise the underlying reef structure and physical processes controlling the formation of these unique reefs. More information about the expedition can be found at http://farasanbanks.livingoceansfoundation.org/.

Rare commence first Malagasy conservation campaign in Velondriake

Blue Ventures' conservation scientist Gildas Andriamalala recently returned to Madagascar to establish the country's first Rare Pride

Campaign, after receiving nine weeks of intensive training in the use of social marketing and communication in conservation.

Rare is the global leader in social marketing for biodiversity conservation and training, and supports leaders from the world's top environmental organisations in over 50 countries in social marketing, a method for changing attitudes and behaviours.

Gildas will be running Rare's first campaign in Madagascar, beginning in spring 2009, with the aim of building public support for the sustainable management of threatened coral reefs and marine resources in southwest Madagascar.

Gildas delivers his presentation at Georgetown University, Washington D.C

The first three-month phase of the campaign was held in Washington DC, with eight other new 'Pride' campaign managers from Mongolia, Thailand, Laos, Fiji, Chuuck, Guam and the Bahamas. Intensive training at Georgetown University focused on developing leadership skills for communication with stakeholders about key conservation issues. Gildas received hands-on tuition in new methodologies, tools and computer software, all aimed at increasing the success of the Madagascar campaign.

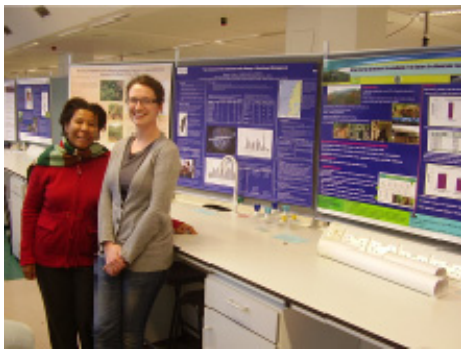
During a public launch in Washington to inaugurate the start of the new campaigns, Gildas spoke about some of the issues facing marine conservation in Madagascar, introducing plans for the new campaign partnership between Rare and Blue Ventures..

Over the next two years, the Madagascar campaign will focus on working with local Vezo communities to reduce destructive and unsustainable fishing techniques. Throughout the campaign Gildas will receive ongoing training as part of a master's degree at Georgetown University and his work will form a key component of Rare's broader ongoing effort to develop strategies for reducing dependency on marine resources.

For further information on Rare please visit:
www.rareconservation.org

Conferences and workshops

In March this year, Blue Ventures' former staff member, Volanirina Ramahery, travelled to the United Kingdom to attend the Student Conference on Conservation Science at the University of Cambridge. Volanirina attended the conference on a scholarship after submitting a poster on Blue Ventures' turtle conservation research in Madagascar. The conference is aimed at students and young conservation scientists to gain experience, develop new ideas and establish contacts for furthering their careers. The conference also brings together conservationists from all over the world to exchange ideas. This year's meeting included three other attendees from Madagascar, working in terrestrial conservation. Several presentations raised the profile of marine conservation at this year's meeting, particularly an engaging talk given by Professor Callum Roberts, from the University of York, discussing the importance of historical perspectives in marine conservation and management, and a presentation from Jennifer Jacquet, a PhD student from the University of British Columbia, on why consumers alone can't save our fish.



Volanirina and Blue Ventures Research Coordinator, Frances Humber, with conference poster.

"It is challenging for young conservation practitioners from developing countries to update their knowledge, as access to information is more difficult and advanced communication tools are often unavailable," says Volanirina "conferences such as this provide conservationists with important opportunities to build capacity and learn about current approaches from their international colleagues."

Volanirina now coordinates the WWF marine programme in the southwest of Madagascar, and is still closely involved in Blue Ventures' activities in the region.