Zwazo

Number 20 Seychelles conservation magazine

MARINE CONSERVATION IN THE WESTERN INDIAN OCEAN

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Zwazo

Zwazo is produced biannually by Nature Seychelles. Nature Seychelles is a non-profit, non-governmental organization that has worked in conservation in Seychelles since 1998. Its primary objective is to improve the conservation of biodiversity through science, education, awareness and training programmes. To achieve this we are dependent on voluntary support and funding. If you would like to help this work, please contact us at the address below.

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A word from the FRONT LINES

Yes, We can solve the Problem

The marine crisis is upon us. It's the End of Days for marine life, the headlines scream at us almost everyday. The doom and gloom is reflected in the media but also by our own scientists. Increasingly, the scientific community has become almost obsessed with describing problems. How much research is needed to tell us once again that corals are bleaching? How many symposia do we have to attend to listen to yet another presentation on over fishing? How many more projects are going to be funded to investigate the issues to do with coastal zone management?

The public has become increasingly numb to the litany of Bad News about the environment, especially what is happening to marine life. But that does not mean that the problems are not real. It just demonstrates that we need to roll out solutions that answer to the challenges and at the same time grab hearts and minds and inspire people.

In this issue we carry articles that showcase some matters that need immediate attention and others where answers are at hand, where people are involved in programmes that increase knowledge and inform decision making, and in some cases where problem resolution comes from the most unexpected sources. These, I believe, are good ways to snatch peoples' attention away from the dreary and the dismal and get them thinking actively about conservation. Yes, conservation can work. And it's great to see that many of these articles in this issue of Zwazo are written by scientists who propose solutions based on field research as well as by managers who are experimenting with solutions in situ.

Nirmal Shah

In the Next issue of Zwazo:

Celebrating Biodiversity

2010 International Year of Biodiversity

2010 is the international year of biodiversity. We are inviting contributions for the next issue of Zwazo, January - June 2010, whose focus will be on saving the endangered species of the Western Indian Ocean. Contributions should be 500-800 words, illustrated with 2-3 high quality pictures, and should be sent to: **Liz Mwambui - liz@natureseychelles.org**

Central Bank hears from environmentalist

Nirmal Shah was one of the panellists at the Central Bank of Seychelles (CBS) Anniversary event held on the 3rd of November 2009 at the International Conference Centre on Mahe. Following the introduction by Central Bank Governor Pierre Laporte, and the keynote presentation by the President of the Seychelles James Michel, the panellists were invited to provide views from their sector on the recent economic reform process in Seychelles. Following is the full text of Shah's presentation.

Ladies and gentlemen, I would like you to consider the Seychelles 1 Rupee coin. On the tails side an extraordinary event is depicted. A triton shell or lanciv in Creole is eating a starfish. The starfish is the Crown of thorns starfish that was feared in the 70s and 80s as the prime destroyer of coral reefs; and the triton was thought to be its predator. Then in 1998 warm waters bleached most of our corals causing massive die off. Along with the coral went the crown of thorns as it had little food left. The moral of the story is that sudden change, or stochastic events, like global warming as well as the economic crisis and the resulting restructuring program can sweep away the existing status quo as well as some cherished belief systems.

Ladies and gentlemen, just as our currency is decorated with environmental icons and the central bank logo depicts a protected species so it is that our two main economic pillars, fisheries and tourism, have their foundations built on use of wild species, natural landscapes and ecosystem services. The environment, and the economy AND how we see ourselves as Seychellois and as a nation are all intertwined. Who or where would we be, for example, if the coral reefs were so badly affected that they could not feed the beaches which then disappeared?

The economic restructuring has had an impact on vulnerable groups and other communities and as people face hardships they inevitably turn to natural resources to eat or to sell and thus we see poaching as well as use of protected and other wild species on the rise. At the same time a small growth industry in environmental consultancies has emerged propelling the rise of many environmental NGOs where previously there were only a few.

In fact, as part of the restructuring I see that the environment can be the source of new and innovative growth industries and activities, as we have seen in other countries. But barriers, particularly inappropriate policy and legal frameworks, monopolies, petty jealousies and constrained funding, prevent a game change.

Nevertheless, a recent scientific paper has shown that of all the countries in the region, Seychelles has the most socio-economic potential to leap frog a so called natural calamity like coral bleaching. That's great but how do we leverage this capital? Is it with sameness or with newness? Thank you.

Nirmal Shah, second right in picture, at the symposium.

Photo courtesy of Seychelles Nation

Praise for Nature Seychelles' Agro-diversity efforts as Heritage Garden opens

The Heritage Garden at Roche Caiman was officially opened at the Nature Seychelles' Centre for Education and Environment at Roche Caiman. The opening coincided with World Food Day celebrations jointly held by Nature Seychelles and the Seychelles Agricultural Agency and whose theme for the year was "Achieving food security in times of crisis".

On hand for the opening was the Minister for Environment, Natural Resources and Transport Mr. Joel Morgan, Members of the National Assembly, District Administrators, Principal Secretaries, officials from the Seychelles Agriculture Agency and Seychelles Fishing Authority, Wildlife Clubs of Seychelles, and the public.

Mr Morgan lauded Nature Seychelles efforts in establishing the model garden saying it compliments government's efforts towards achieving the country's food security.

Under the auspices of the Food Security Strategy 2008/2011 launched by government, Nature Seychelles and the Seychelles Agriculture Agency signed a Memorandum of Agreement at the opening.

"The MOU attests further to the Government's wish to see the development of public-private partnership in the Seychelles". Mr. Morgan said.

On a tour of the garden, visitors were astonished to see what could be achieved with a little care and innovation.

"This is a small garden around a building. It has no pretensions to winning the best garden in Seychelles award - you will not see wrought iron benches, garden ornaments, manicured lawns and so forth. Rather, the objective is to demonstrate to students, wildlife clubs, parents, and the general public that establishing gardens of food, aromatic and medicinal plants in school compounds, back yards and even around commercial buildings is possible, can look good and taste even better. This Garden is also a learning platform about traditional food and medicinal plants, Creole folklore and culture, ecology, and agro-biodiversity". Said Nirmal Shah, Nature Seychelles CEO.

Colourful displays of horticulture agro and fish products mounted by the Wildlife Clubs of Seychelles, Seychelles Fishing Authority and the Farmers Association bellied the days theme and rapidly emptied pockets.

Photos: Minister Joel Morgan and other guests at the garden

Yes U Can Garden

Nature Seychelles' Heritage Garden at Roche Caiman was opened on 16 October by the Minister for Environment, Natural Resources and Transport, with the ever-smiling Antoine Moustache the big chief of the Seychelles Agriculture Agency facilitating things and an enthusiastic crowd supporting us.

The new theme I introduced in Seychelles through this Garden is Edible Landscaping. Now I want to propagate another practice I saw in New York (of all places!) - Low-Cost Gardening or what I have dubbed "Yes, U Can Garden". Food, and other goodies like aromatic and medicinal plants, can be grown and maintained for very little money. And, you can beat the recession, fight the food crisis, be healthy, make new friends and save genetic resources, all in one fell swoop!

The first trick is to maximize your growing space. Make use of any potential area. The more space you create the more you can grow. Soil can be trucked from many places. Someone I know carried earth in buckets at the back of her car so she could grow herbs in her apartment.

Back yard composting is easy and there have been many local programs advocating this practice. Manure can be purchased from various places sometimes at reasonable prices. The compost produced by STAR Seychelles has the advantage that it does not contain seeds and spores of weeds.

Lucina demonstrates that food and other goodies can be easily grown in small spaces

Tools are expensive, but one can accumulate tools for little money. A friend of mine got her entire tool kit by acquiring old or discarded tools from neighbours and farmers– some tools simply needed a new handle. Containers for planting can be collected for free from various sources. One can use empty juice and milk Tetra Packs for seedlings. My father grows an amazing diversity of food plants in containers at the back of his house in the middle of town.

As for seeds, save them from your purchases at the shop or market. At home we collected seeds from those tasty cherry tomatoes and had a bumper crop. Some people in the US exchange seeds and seedlings- a Seed Swap. This is a great idea because it also builds friendships and personal networks. Many Seychellois sell plants at various events, the largest being the National Horticulture Show. At the end of these events some sellers dispose of their plants at discounted prices. And of course, save the seeds from your last crop.

And for materials like trellises, at the Heritage Garden we used discarded wood and branches scavenged from Casuarina trees to support beans and other vines. The best known trellis at the Heritage Garden is the one supporting the incredible Pom Edwar, an aerial tuber used by Seychellois in the past but now shunned in favour of imported potatoes.

Last but not least – water. You don't have to use treated water from the tap. Rain water harvesting is easy because of the high rainfall and sloping roofs in Seychelles. Containers such as the commonly available blue plastic barrels can be linked together to create an adequate reservoir.

Enjoy your Low-Cost Garden. Perhaps you can even recoup your small investment by selling some of your crop. Yes, U Can Garden!

Nirmal Shah

Thank you!

Lucina Denis part time horticulturist at Nature Seychelles who put this garden together. Mr Terence Vel, Education Coordinator the manager of this project. Mrs. Kerstin Henri, Project Coordinator, the young volunteers who have spent holidays working with us, Mr. Ferdinand Vidot, Mr. Jose Loustau Lallane and Mr. Ahweng who gave us plants, Mrs. Marmeda Moustache our moral support, the Seychelles Agriculture Agency and its predecessor who always backed this idea and provided support for the opening, including some funds.

The Heritage Garden at Roche Caiman is part of the Heritage Gardens project that promotes the propagation and use of traditional food and medicinal plants in schools and communities. It was initiated in 2005 by Nature Seychelles and Wildlife Clubs of Seychelles with the Ministry of Environment and Natural Resources and Ministry of Education.

The Battle of the Zon!

Earthmovers have sunk. The Calvary has been called in. School children have grappled with it. Still it persists. This is the saga of our battle to manage the aquatic reed *Typha javanica*, Zon in Creole.

The reed has engulfed the central marsh area of the popular urban wetland, the Sanctuary at Roche Caiman, an artificial wetland resulting from reclamation work in the east coast of Mahe in 1986. It is situated between the Roche caiman housing estate and the National Sports Complex. In 2002, the government gave its management to Nature Seychelles.

The reed was introduced to the wetland possibly as a habitat for certain birds like the yellow bitterns, which prefer thick vegetation to hide and nest in. By the time Nature Seychelles took over, the reed had become terribly invasive and had spread to areas where it was unsuitable - the open marsh that migratory birds and waders prefer. Thus began the battle with the reed.

"Our first attempts were with the brush cutter. But then we noticed that this stimulated re-growth." Says Terence Vel, who has been part of successive attempts to control the reed. "Next we asked volunteers, like the wildlife clubs, to help us remove it, to no avail."

The Calvary, in the shape of the American navy, who from time to time carry out voluntary work with Nature Seychelles, were next. They helped to weed and cut the reed.

"But in the end we concluded that you probably needed the same amount of people for the same number of reeds". Vel says with a laugh. It seemed the reed was resisting attempts to slow down its re-growth and the wetland managers were literally pulling their hair out - along with the Typha - in frustration.

"Eventually we brought in the heavy artillery." Says Nirmal Shah, Nature Seychelles CEO. "We were advised by experts to remove a layer of the mud along with the Typha. It appears to take longer for re-growth to occur and makes it easier to manage".

So earthmovers came in to cut through a layer of the marsh soil. "But we hadn't reckoned with the weather." Vel says, marvelling at how things quickly turned. "We had very good success in the first days. But an unpredictable burst of rain left the place drenched and the earthmover, while going over a soggy spot, sunk, using up many hours to get it out!"

Eventually work was completed and migratory birds soon arrived. The marsh attracts the common, terek and curlew sandpipers; grey plovers; turnstones; greenshanks and many more birds. It is home to the bitterns, grey heron, various dragonflies, freshwater terrapins, crustaceans, the endemic killifish and other species. There is also a native mangrove species *Acrostichum aureum* - Fouzer Lanmar - adapted to the site.

As for the battle, well, it requires more hands. We hope to encourage the harvesting of the reed by weavers. Typha was used to stuff mattresses in the past, but is used for other items now like mats, chairs, and hats. As biomass, it's a useful addition to compost. We welcome other ideas on keeping the reed at bay.

Bankers "MADD" for the Environment

No sooner had Nature Seychelles made public its fight to manage the Zon at the Sanctuary at Roche Caiman through a local newspaper, than willing hands were offered. They came in the unlikely form of local bankers. Read about their day out at the Sanctuary below.

On Saturday 7 November 2009, Barclays Bank employees got down and dirty, alongside Nature Seychelles staff and students from nearby Plaisance school, to help in maintenance work at the popular wetland – the Sanctuary at Roche Caiman. They happily weeded, scraped and cleared in and around the Sanctuary.

The Bank's staff – drawn from different departments and accompanied by family - were taking part in the "Make a Difference Day", MADD. This is a global Barclays event held annually to promote volunteering, and to encourage people to donate their time and give back to the community around them. Barclays has long been associated with MADD and different groups from Barclays Bank Seychelles were on this day involved in varying activities around the island.

The decision to lend a hand at the Sanctuary was taken after employees read about the Typha javanica (Zon) reed invasion at the site in a local newspaper. A visit to the Sanctuary prior to the Saturday activity convinced the staff that they could contribute to its on-going improvements. Although they were not able to remove Typha reeds, owing to the depth of the water and the sticky mud, they did a great job of cleaning up, weeding around and on the boardwalk, removing creepers along fencing, cutting tall grasses, and removing debris.

"We hope that we have contributed as much as we could on this day and we trust that we have helped to make a difference in the on-going restoration of the site". Said the staff who hoped that their actions can influence the volunteering spirit.

For Terence Vel, Nature Seychelles' Education Coordinator, the visit was a good occasion to mingle with like-minded people and highlight both the Sanctuary and its activities. Terence is launching an appeal to other businesses and groups to get involved in ongoing restoration of the Sanctuary. "We hope that other local groups will be inspired by this work and get involved" he said.

WorldBirds: Seychelles is regional centre for bird-watching information

Bird watching, you may be surprised to learn, is one of the most lucrative forms of recreation and tourism. Bird watching in North America alone generated US$25 billion a year in a survey taken in 2001. Thousands of visitors to Seychelles are either keen birdwatchers, what are known as "twitchers", or amateurs with more than a passing interest in photographing or spotting birds.

Now in an effort to both collect scientific information from all these birdwatchers and at the same time promote bird watching as an vital ecotourism activity able to contribute funds for conservation and for local communities, a global system called World Birds has been set up. Coordinated and funded by BirdLife International, the Royal Society for Protection of Birds (RSPB) and the National Audubon Society of the US, the idea is to implement a network of citizen participation projects across the world to collect bird observations.

Nature Seychelles has been chosen to manage the national level as well as coordinate the WorldBirds hub for the Western Indian Ocean islands. Nature Seychelles' Science Coordinator David Derand manages the country's database.

Ian Fisher of the RSPB explains the rationale behind WorldBirds, "Much information on bird numbers and distribution is published in the form of bird atlases, technical reports, site guides and scientific papers. However, large quantities of information are 'lost' - for example in birdwatchers' personal notebooks, in unpublished trip reports or on data sheets that have not been computerised. There are probably millions of valuable sightings, discoveries and other records that fall into this category, many of them for countries that have very high bird diversity but no common system of monitoring their numbers".

However, if it were possible to pull all these records together from both local and visiting birdwatchers, they would provide a treasure trove of information that could be used by general birdwatchers, conservationists, policy makers, environmental agencies, students, researchers, guides, developers, NGOs, tourist agencies and resorts" says Nirmal Shah, Nature Seychelles's CEO. WorldBirds is such an initiative, and is Internet-based so it can develop a global family to capture 'lost' data cheaply, mobilise citizens, develop local capacity, and encourage a more scientific approach to data collection amongst hundreds of thousands of people.

"This is a fascinating and exciting project which anyone with an interest in birds can get involved in" continues Shah. "Birdwatchers prepared to input their own personal observations through a user-friendly web page will be able to participate in the conservation of natural heritage at a variety of different levels" he says. To participate, visit the hub - www.worldbirds.org - and select a region.

Top: Newly hatched Seychelles Magpie Robin on Cousin Island © Rachel Cartwright

Need to know about **Bird Rescue?**

Nature Seychelles regularly receives enquiries about how to help birds that have been rescued. People have also brought in injured or helpless birds - a Frigatebird with water in its wings, a pair of Tropicbird chicks rescued from a tree that was about to be cut, and a distressed Wilson's Petrel out of its depth on Mahe.

But it is important for the public to know what to do when they find apparently orphaned or injured birds. Therefore, Nature Seychelles is stepping up its efforts to educate the public on how to handle such birds.

"The most important thing to do when one finds a bird in distress is to determine whether it has an injury, how bad it is and whether it is better to leave it where it is". Says Terence Vel, Education Coordinator. "For instance, the decision to rescue the Frigatebird was good because it was unable to fly and it would have been in more danger had it been left where it was."

But this is not always the case. A chick out of its nest on the ground or in bushes may not be as helpless as it seems. "Often these 'lost' baby birds are fledglings that have left the nest but are still being cared for by the adults. Although they may look fluffy and helpless, they are old enough to escape predators. If you try to pick it up, it will probably run or fly away quickly to shelter. If it does, leave it alone and the parents will come back to feed it". Says Nirmal Shah Nature Seychelles CEO.

But if one finds a very small chick that does not have proper feathers and is helpless, the best thing to do is to find its nest and put it back, as quickly as possible. If a nest has fallen from a tree, put the nest back in the tree, or make an alternative nest using an empty margarine tub (or other shallow container) with a little dry grass in the bottom. Secure the nest in the tree out of the way of rats and cats and put the chick into it. If chicks are still alive when you find them, chances are that they have only recently fallen from the nest and that parents are still nearby waiting to feed them.

Terence Vel and David Derand being interviewed for SBC Radio

This applies to seabird chicks as well as land bird chicks. Young seabirds of some species are still fed by their parents even after they leave the nest and fly out to sea, so even if you succeed in raising a bird until it can fly, there is no guarantee that it will be able to feed itself.

If a bird is injured seek help from a vet. "For instance the veterinary service at Union Vale (Mahé) or Cote d'Or (Praslin) may be able to help and so can the SSPCA (Seychelles Society for the Prevention of Cruelty to Animals)." Vel Says.

The public must also be mindful of their safety. If unsure about a bird's health, it is best to ask advice from a vet or a bird expert. Some birds like the Black Crowned Night Heron, Manik Lannwit in Creole, can be very aggressive if they feel threatened and should not be handled without protection.

From Italy with Love

Italian visitors to Cousin Island now have access to information on the Island in their own language. Prof. Massimo Pandolfi of the University of Urbino and the Seychelles Heritage Conservation Study Group recently presented Nature Seychelles with an Italian version of the Cousin Island tourist information leaflet he produced with colleagues. Pandolfi was responding to a need for a third translation of the leaflet that is currently in English and French. He received support for its typesetting and printing from the Darwin Cooperative Society of Rome and WWF Italy. Air Seychelles kindly provided freight from Italy to Mahe. Prof. Pandolfi is a long time friend of Nature Seychelles. He and a team from Urbino University have been conducting various research including on the Seychelles Kestrel (Katiti), an endemic to the granitic Seychelles whose findings were revealed in Zwazo 19. Prof. Pandolfi also presented Nature Seychelles with a donation of Euros 2000 for its conservation work on Cousin. "We are very grateful for this help and we look forward to future collaboration." Said Kerstin Henri, Nature Seychelles' projects coordinator on receiving both donations.

Photo: Kerstin Henri (L) with Prof. Pandolfi

bellissimo giardino

Dr. Alessandro Battilicchio, Italy's youngest senator and a group of 15 - including volunteers from scouts troops, youth hostels and other community groups - braved a hot Mahe afternoon for a visit to the Heritage Garden at Roche Caiman. On hand to receive the group was Nature Seychelles' CEO Nirmal Shah and part time horticulturalist Lucina, who enjoyed practicing her Italian as she led the tour. Lucina proudly showed off spices, fruits, and herbs, and treated the guests to a feast of ripe Guyava and Star fruit. Mr. Shah explained that the garden was started to re-introduce to Seychellois old and beloved plants. The guests found some familiar ones too - herbs and spices used in Italian cooking. Dr. Battilicchio said it had been a pleasant afternoon and thanked Nature Seychelles for its hospitality. The tour was organised by the 7° South travel company, whose staff were also present.

Dr. Battilicchio (L), with Lucina (R) and part of the group
Top: The visitors admire the garden

Nirmal Shah is the new WIOMSA President

Nirmal Shah, the CEO of Nature Seychelles has been elected the President of WIOMSA, the Western Indian Ocean Marine Science Association.

WIOMSA is well known to Seychelles and the rest of the region as the most visible and active organization of its kind covering Southern and Eastern Africa and the Western Indian Ocean islands. The news has attracted scores of congratulatory messages from all over. The Chair of LUNGOS, Seychelles' umbrella organization of civil society, Bernard Elizabeth has said: "This is a recognition and acknowledgement of your most valuable contributions and a confirmation that a small island state like ours does have capacity to provide leadership to international organizations such as this one."

Shah, a founder board member of WIOMSA, has been contributing to the organization since its inception. He was until recently the long serving Chair of the Marine Science for Management (MASMA) programme, WIOMSA's funding arm. In her recent address to members the outgoing President Nyawira Muthiga said: "I am very grateful to Nirmal for the achievements made by the MASMA program during his tenure; he has brought great acclaim to the program nurturing it from a virtually unknown to the reputable and highly effective grant providing entity that it is today." His most recent efforts for the organization include being co-editor of the WIOMSA magazine and assisting in developing WIOMSA's WIO-COMPAS, the world's first certification of marine protected area staff.

WIOMSA has grown at a rapid pace and its scientific publications, its highly respected journal, its Marine Science Symposia and other products and services are playing a vital role in growing marine and costal science and management in the region. Dr. Magnus Ngoile WIOMSA's first President has said " Nirmal's stewardship is very much needed at this critical time when the Association is transforming into a new generation of the scientific community it is intended to serve with even more challenges than before."

Photo: The new WIOMSA board. Courtesy of WIOMSA

The Western Indian Ocean Marine Science Association (WIOMSA) was established as a regional professional, non-profit, membership organization, in 1993. It is registered in Zanzibar, Tanzania, as a non-governmental organization. It is dedicated to promoting the educational, scientific and technological development of all aspects of marine sciences throughout the Western Indian Ocean (WIO) region (consists of 10 countries: Somalia, Kenya, Tanzania, Mozambique, South Africa, Comoros, Madagascar, Seychelles, Mauritius, Reunion (France)), with a view toward sustaining the use and conservation of its marine resources.

More information on www.wiomsa.org

Assessors for new protected area certification

Photo: The new assessors with workshop facilitators. Courtesy of WIOMSA

Nirmal Shah, is among eight marine experts now certified to assess Marine Parks professionals for WIO-COMPAS, the programme that assesses and certifies Marine Protected Area (MPA) professionals in the Western Indian Ocean region based on standards of excellence. It is a joint initiative of the Western Indian Ocean Marine Science Association (WIOMSA) and the Coastal Resources Centre (CRC) at the University of Rhode Island (URI). It was started to equip the region with the skilled personnel required to ensure effective management of MPAs in the extensive region. Nirmal received the assessor qualification after attending training in Nairobi in June 2009.

Ronnie Renaud **(inset)** Chief Executive of Seychelles' National Parks Authority, became the first Seychellois WIO-PRO in 2009.

COPout in Copenhagen?
The BirdLife Patnership speaks out

The fair, ambitious and legally binding agreement to tackle climate change, which was scheduled to be finalised at the recently concluded UNFCCC Climate Change Conference (COP) in Copenhagen, did not materialise.

This latest of 15 Climate Change COPs was mandated to agree a new global climate deal under the UNFCCC umbrella, to address emission reductions and adaptation to climate change. But with some of the 192 participating governments negotiating with each other away from the main conference proceedings, acrimonious disputes about the legal shape of a new treaty ate up trust and patience, and above all, time. Instead of the hoped-for new legally binding climate change treaty, there is the Copenhagen Accord.

The Copenhagen Accord does not contain targets to help tackle climate change. There is no agreement on a long-term global mitigation target of 50% by 2050 to avoid dangerous climate change. There was also no agreement that global emissions should peak by 2015-2020. According to the Intergovernmental Panel on Climate Change, both targets are necessary to achieve stabilisation of greenhouse gas concentrations at 450ppm, and to avoid global temperature rises of more than 2^0C above pre-industrial levels, which would result in dangerous and irreversible effects on nature, people and the economy.

"The BirdLife Partnership asked the world's leaders to agree concrete targets in Copenhagen to reduce greenhouse gas emissions, and they have failed us", said Melanie Heath – Senior Advisor on Climate Change at BirdLife.

However the Copenhagen Accord does provide political context and shape, and forms a useful, if inadequate, basis for negotations and agreement next year.

"It is essential that countries build on this accord, and the texts developed since Bali in 2007, to work together to finalise a strong and legally binding agreement as early in 2010 as possible. The world's people and ecosystems cannot afford, and some of them will not survive, the environmental, social and economic consequences of further delay", said Melanie Heath.

"The process will start again next year, leading up to COP 16 in Mexico", said John Lanchbery. "Perhaps it will be all the better for the nasty surprise we had in Copenhagen."

For more information on how the Copenhagen Accord shapes up against "the Birdlife Patnership 5 Asks" see : http://www.birdlife.org/news/news/2009/12/cop_ends.html

Saving coral reefs from the ground up -
the first Reef Restoration Training Workshop in the region

"The old saying that everybody talks about the weather but no one does anything about it, can in our region be translated into everyone talks about coral reef bleaching but no one is doing anything about it", says Nirmal Shah who has been commenting on this lack of action for years. Now an exciting workshop which took place from 27 to 31 July at the Institute of Marine Sciences, Zanzibar brought together those carrying out or planning to carry out coral reef restoration projects in the Western Indian Ocean region with scientists working on improving the cost-effectiveness and efficacy of reef restoration. The workshop shared lessons learnt from research studies and actual restoration projects as well as informing participants of new techniques and trying out some of these in the field. "This helped those who wished to get hands-on experience of restoration techniques" says David Derand Nature Seychelles' Science Coordinator who was one of the participants. In addition, the scientists learned about the successes and problems of real restoration projects so that they could better target their research to managers' needs.

Some of the objectives of the workshop were

1. To review successes and failures of existing coral reef restoration and remediation actions in the WIO region;
2. To evaluate critical conditions (physical, biological and social) for initiation of restoration actions (i.e. when and where?);
3. To demonstrate the importance of coral nurseries in reef restoration;
4. To strategise on approaches that will involve local communities in reef restoration.

Cousin Island - target for future coral restoration

Bringing Bats off the Brink:

Seychelles Sheath-tailed bat monitoring continues

The Seychelles Sheath-tailed Bat (Sousouri Bannan) is possibly the rarest bat in the world. It is an endemic of Seychelles numbering an estimated 70 individuals. Although in the past it was present on four granitic islands - Mahe, Silhoutte, Praslin and La Digue - it is now believed to occur only on Mahe (around 40 individuals in three roosts) and Silhouette (32 individuals in one roost). Listed as Critically Endangered by IUCN, it is considered close to extinction.

Nature Seychelles has been monitoring the bat roosts on Mahe in order to evaluate threats to the bat, discover the possible cause of the decline of the species and enable action to be taken to bring back this rare and unique mammal from the brink of extinction.

Monitoring began in 2004 through a project called Bats on the Brink funded by the BP Conservation Programme (BPCP) and carried out with collaborators from the UK, the Ministry of Environment, Nature Seychelles and Wildlife Clubs. This project was able to confirm that previous populations of the bat on Praslin and La Digue appeared to have gone extinct. It also uncovered two previously unknown roosts on Mahe and availed baseline information on the bat. A species action plan was drawn up that proposed further conservation and management activities that would further help the bat. Key to this was continued monitoring and study of the bat populations.

A follow-up project - Bringing Bats off the Brink - continued in 2006-2007, to investigate the causes of decline further, and to monitor changes in behaviour and population size.

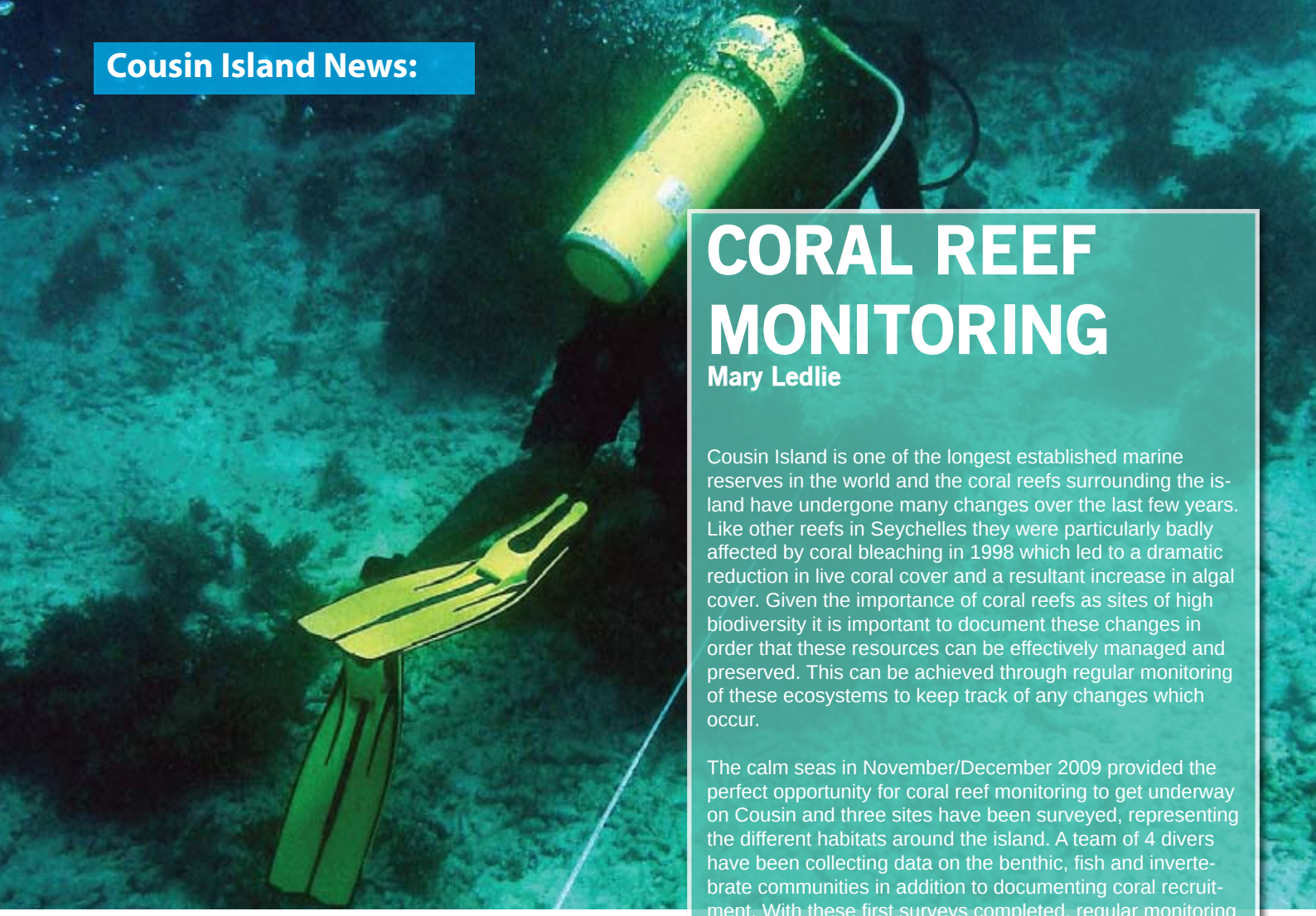
The current monitoring is supported by Conservation International.

"It is believed that the main threats to the bat are habitat destruction, disturbance of roosts, food shortages suspected to result from over use of pesticides - this species being purely insectivorous, and possible predation by barn owls". Says David Derand, Nature Seychelles' Science Coordinator. "Further investigation of these factors is vital to understanding the decline of the bat. Apart from keeping a tally of the numbers at the roosts on Mahe, we are also interested to uncover information about food abundance particularly in relation to the influence of new potential developments in the vicinity of the roosts".

The project team periodically records dusk emergence of the bats. They have also embarked on a food abundance and diversity investigation by laying traps and collecting insects around the roosts for study.

An emerging threat to the bats is that of development around the roosts in Mahe. The bats appear to be loyal to these roosts and the foraging locations around them all year round. Therefore the roosts used by the bat and their surrounding areas must be given protection. Nature Seychelles is advocating through the relevant authorities for this protection.

Photos Top: Seychelles sheath-tailed bat © Sinclair Lang Above: Setting up insect traps



CORAL REEF MONITORING

Mary Ledlie

Cousin Island is one of the longest established marine reserves in the world and the coral reefs surrounding the island have undergone many changes over the last few years. Like other reefs in Seychelles they were particularly badly affected by coral bleaching in 1998 which led to a dramatic reduction in live coral cover and a resultant increase in algal cover. Given the importance of coral reefs as sites of high biodiversity it is important to document these changes in order that these resources can be effectively managed and preserved. This can be achieved through regular monitoring of these ecosystems to keep track of any changes which occur.

The calm seas in November/December 2009 provided the perfect opportunity for coral reef monitoring to get underway on Cousin and three sites have been surveyed, representing the different habitats around the island. A team of 4 divers have been collecting data on the benthic, fish and invertebrate communities in addition to documenting coral recruitment. With these first surveys completed, regular monitoring will continue in the future to help us document any changes which are taking place on the reefs.

Sail fish ashore

Eric Blais and Jovani Simeon

Cousin Wardens and Conservation Officer Eric Blais were quite intrigued when the corpse of a young sailfish washed up on the shores of Cousin Island on the afternoon of Wednesday 22nd July.

"We found it near one of the wardens' houses. It was about 250cm in length and weighed approximately 25-35 Kgs", said Eric Blais. "It's difficult to tell what happened to it exactly, but I doubt that a local fishermen who fishes for food would willingly loose such a big catch. Our guess, although we have no evidence, is that it was lost during sport fishing. Either that or it died of natural causes."

A fishers catch, hurt during sport fishing or died of natural causes? Regardless, the probability of one washing up on Cousin would be rare.

The Seychelles Sports Fishing Club was contacted for an opinion and member Marc Houareau had this to say: "It is definitely sailfish season and there are a lot of them in our waters at the moment. It is possible that the fish was caught and died after a long fight, but most of our SSFC members who practice "catch and release" would not have released a dead fish or a fish that was bleeding as it is easy to see whether the hook was in its bill or had damaged the gills. But the other possibility is that it was hit by a boat as during spawning season, many sailfish just lie on the surface of the ocean."

Photo: Jovani Simeon Cousin's senior warden with sailfish

So there you have the mystery of the Cousin Island sailfish.

News round up from the Seychelles Seabird Group

Coconut husks make excellent substitutes for nests, Cousine Island in the Seychelles has found. The Island's managers say they have been using coconut husks for their resident Fairy terns who seem to have adopted to the new 'nests' fairly quickly. The birds have the unusual habit of not building nests, laying their eggs instead in exposed areas on branches and rocks. Many of the eggs succumb to harsh weather conditions.

This and other exciting seabird news was relayed via the bi-annual November 2009 issue of Seabird News produced by Nature Seychelles for the Seychelles Seabird Group (SSG).

The SSG is made up of Island managers and conservation officers from a number of Seychelles islands that are important for seabird conservation as well as the country's ministry of environment.

Seychelles is internationally important for seabirds, with 18 breeding species numbering millions of individuals. For the last 30 years conservationists have been conducting research programmes and undertaking censuses. The SSG was launched by Nature Seychelles - with backing from the Norwegian Embassy and Airtel Seychelles - with the aim of coordinating this effort. Since its formation partners have collected robust data on seabirds and received practical training of field staff in standardised methods of monitoring laid out in Seabird Monitoring Handbook for Seychelles.

They meet twice a year to share information on ongoing seabirds activities. Their last meeting was held in Praslin in November 2009. Members received updates from the islands on methodologies and results of July 2009 censuses (for white-tailed tropicbirds, white terns, lesser and brown noddies), and breeding performance of key seabird species (white-tailed tropicbirds and white terns).

On Cousin Island, the White-tailed tropicbird population appears relatively stable. Monitoring is done on Cousin for seven breeding seabird species, notably twice a year for tropicbirds and White Terns. Censuses are also carried out for Lesser Noddy and Brown Noddy, Audubon's Shearwater, and Bridled Terns.

2009 was good year for the Sooty Tern colony on Bird Island reports Jo Savy. The island did not experience a high chick mortality as in previous years and as usual cropping of eggs from half of the colony for sale locally was done. This formula seems to be a winning one, maintaining a healthy sized colony and raising income for further conservation work on the island. The Lesser Noddy Tern population is thriving and the Common Noddies, Fairy Terns and White Tailed Tropic Birds remain stable.

On Cousine Island, the forest has matured very well and now provides valuable nesting sites for the increasing numbers of Lesser Noddies.

And on Aldabra, breeding observations of Seychelles' rarest breeding bird the Caspian tern are continuing. Observations made over the most recent breeding season have provided additional information on breeding locations as well as some early data on breeding success. Although Caspian tern chicks can vary in their colour morph, preliminary observations indicate that the chicks hatching on the atoll may well be predominantly dark morph chicks. Aldabra is the only location in the Seychelles where this species breeds and it is the only non-continental breeding area for the species in the world.

The long-term survey of seabird breeding parameters conducted on Cousin, as well as insights into innovative projects such as defining marine IBAs for Seychelles and using seabird tracking (geolocators) on Cousin and D'Arros to investigate wedge-tailed shearwaters foraging ecology was also presented.

The deadly grip of the Bwa-mapou -

Effects of *Pisonia grandis* on seabirds

By David Andrews and Gilles-David Derand

Species of tree within the genus Pisonia are found on seabird islands throughout the tropical oceans and are able to flourish in the highly acidic guano soil and use the seabirds to disperse their seeds. However, the relationship between Pisonia and its seabird disperser is complex and often fatal for the birds (Burger, 2005); the seeds of the Pisonia become entangled in the feathers often preventing the bird from flying and feeding, resulting in death.

Thus, the aim of the survey conducted by Nature Seychelles with the help of David Andrews from the University of East Anglia/ UK, was to establish a standardised procedure in order to quantify the effect and scale of Pisonia induced mortality on seabirds, to investigate the phenology* of Pisonia and gain an insight into the evolutionary process which has formed this unique relationship, and to provide a factual basis for the possibility of vegetation management. Cousin Island was the main survey site but Aride Island was also visited twice between April and June 2009. Effects of Pisonia on seabirds were quantified by systematic search of any bird unable to fly or dead due to Pisonia gluing in a randomly selected sample of 20 grid squares on Cousin for 15 minutes each, and the seeding phenology of Pisonia was studied comparing two different methods: recording seeding intensity by determining the proportion of each trees canopy that was bearing seeds, and recording the amount of seeds on the ground by dragging an imitation bird over a distance of 50m through the selected grid-square.

Over the three months of fieldwork, a total of 484 seabirds of five species were found dead or dying on Cousin and the estimated number of birds killed during this period is 2,444. Five out of seven species of seabirds were victims of Pisonia on Cousin, Wedge-tailed Shearwater and Bridled tern were not found to be affected during routine surveys. However the two species were both found affected on Aride. Lesser Noddies were the most common victim of Pisonia, however as a population, the White Tern was the most affected on Cousin. As little as four seeds sticking the wingtips together were able to disable an adult bird, this ultimately leading to death in a relatively short time due to starvation. The survey also showed that White-tailed Tropicbirds and Audubon's Shearwaters were significantly impacted on Cousin, in accordance with Catry et al. (2009) who recognised a decline in White-tailed Tropicbird on Aride with Pisonia induced mortality being identified the main cause.

Regarding the phenology of Pisonia, a minor seeding event occurred on Cousin with a maximum of 12.5% of Pisonia trees in seed at any one time, but a major seeding event also occurred on Aride which saw approximately 60-80% of the Pisonia trees producing ripe seeds. All references to Pisonia suggest that seeding events can occur at any time of year and that seeding is relatively random. This lack of seeding seasonality means that seabirds have been unable to evolve to avoid Pisonia by breeding at a certain time. In fact, Pisonia has a very non-dense trunk and therefore can store a lot of water, and this can partly explain why Pisonia can seed at any time of year and is not directly related to weather variables.

This study and the severe impact that Pisonia may have upon seabirds raises the question of whether current densities of Pisonia on Cousin and across the Seychelles are above natural levels. One possible interpretation is that, although *Pisonia grandis* is native to the archipelago, its fast post-restoration establishment, both from seeds and vegetative regeneration of fallen trees or branches, has led to a

high density, which has been suggested is higher than ever before, possibly because slower growing climax vegetation is yet to mature.

The limitation of this study to three months does not allow conclusive figures of Pisonia impact and a more long-term study is needed to understand the full situation. There are important conservation implications arising from this study involving the management of vegetation and the possible control of Pisonia. A reduced Pisonia dominance could be achieved by increasing diversity and encouraging the succession of the island woodland, notably through the manual spreading of native species seeds (e.g. Takamaka *Calophyllum inophyllum*, *Badamier Ternzinalia catappa*, etc), the prevention of vegetative Pisonia re-growth (when a tree/branch falls, remove new shoots) in the vicinity of young trees of other species such as *Ochrosia oppositifolia* and *Morinda citrifolia*, and possibly the cut-down of a number of large Pisonia trees.

*: Phenology is the study of periodic plant and animal life cycle events and how these are influenced by seasonal and interannual variations in climate

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David Derand is Nature Seychelles' Science Coordinator. David Andrews was an MSc student from the University of East Anglia involved with Nature Seychelles in 2009

The secret lives of shearwaters

By Michelle Kappes and Kevin Coustaut

Shearwaters, like most seabirds, spend most of their lives at sea. In order to learn about where shearwaters go when they are away from their breeding colonies, Dr. Matthieu Le Corre from the Université de la Réunion has begun a research program to deploy miniaturized electronic tags on wedge-tailed shearwaters (Puffinus pacificus) at sites throughout the western Indian Ocean. These tags, or geolocators, collect data on light level that can be used to determine the position of the bird at sea. Basically, the time of local noon is used to determine longitude, and latitude is estimated by local day length. The tags are attached to a metal ring on the bird's tarsus using a plastic zip-tie (see photo). The tags also have a salt-water switch, and due to their placement, we can determine when the shearwaters are in flight and when they are resting or foraging on the sea surface. By taking advantage of this technology, we can begin to get a picture of how these wide-ranging seabirds behave during their foraging trips to sea.

Also using geolocators, recent work by Catry et al. (2009) demonstrated that 9 wedge-tailed shearwaters breeding on Aride Island remained close to the colony when raising chicks, and later dispersed up to 3,500 km to the central Indian Ocean Basin during the non-breeding period. Last year, members of Dr. Le Corre's research team recovered 6 geolocators from wedge-tailed shearwaters deployed at Cousin Island. Preliminary analysis suggests that shearwaters from Cousin Island disperse further east during the non-breeding period than those from Aride Island. However, a larger sample size will be necessary to confirm colony-specific differences in foraging behavior.

During 14-29 September 2009, we deployed 24 geolocators on wedge-tailed shearwaters breeding within St Joseph Atoll, Amirantes group, and 24 geolocators on shearwaters breeding at Cousin Island. Field work is planned to deploy similar numbers of geolocators at sites on Réunion Island, as well as off Mauritius and Madagascar. This will be the first attempt to simultaneously study the at-sea behavior of this seabird species across a broad range of breeding sites.

Ultimately, these data will help us answer questions such as: do wedge-tailed shearwaters breeding at different sites in the western Indian Ocean travel to similar locations at sea? Are there specific ocean habitats that are of particular importance for this species? Areas of the ocean that are important to shearwaters may be important for other marine species as well, so these data could be used to help identify marine Important Bird Areas and possibly oceanic Marine Protected Areas.

However, as the geolocators store these data on-board, we won't be able to answer these questions until we recover the tags at the end of the breeding season. This may prove trickier than it sounds because once shearwater chicks reach about a week in age, adults only return to the colonies for brief periods to deliver meals to their chicks. So we may have to wait until the next breeding season starts in 2010 to recover these tags and unlock the secrets of where these different populations of shearwaters spend their time at sea!

Photo: Wedgetailed sheartwater with geolocator © Michelle Kappes

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Michelle Kappes is a postdoctoral researcher and Kevin Coustaut is a MSc student, both working with Dr. Le Corre in the Laboratoire d'Ecologie Marine at the Université de la Réunion

Watching Whales: The potential of whale and dolphin tourism

By Per Berggren

Phoooooshhhh…., a humpback whale surfaces for a breath of air just beside the boat. It is big, black, with a bushy blow and incredibly impressive. It is easy to see that it is a humpback whale from its characteristic dorsal fin sitting on a raised hump. Next the animal leaps clear out of the water, displaying its white underside and tell-tale enormous flippers, and then lands on its back with a thunderous splash. A 14 m, 35 tonnes animal making a giant leap in the air is an incredible sight and something that has to be seen to be fully appreciated. A few more equally stupendous leaps and then the encounter ends with a final surfacing where the whale displays the tail flukes in preparation for a deeper dive. This is wildlife watching at its best and it can be experienced throughout the region between June and October when the humpback whales are visiting their breeding grounds. If you settle for slightly smaller but nor less exciting animals there are plenty of opportunities to watch dolphins year round in many locations in the Western Indian Ocean.

The development of eco-tourism and its subsequent success has significantly contributed to the East African region's economy over the past half-century. It has provided a way of achieving economic sustainability, employment, predictable revenues for local communities, and a means of conserving biodiversity while implementing long-term management strategies for the conservation of species and habitats in the region.

Whale and dolphin tourism has now been initiated in most countries in the Western Indian Ocean region, including Kenya, Madagascar, Mauritius, Mayotte, Mozambique, Réunion and Zanzibar. However, the activities vary significantly – from more or less community-based dolphin tourism in Zanzibar to more commercial operations run by non-locals in Kenya, Madagascar and Mozambique. It presents a potentially sustainable use of marine mammals as an economical viable alternative to hunting. It further improves people's attitude toward the marine environment and

Photo: Leaping humpback whale, Kizimkazi, Zanzibar. © Fredrik Christiansen.

promotes public support for conservation issues while at the same time benefiting local economies. However, during the last decade there has been a change in whale and dolphin watching, which has become closer range and interactive instead of the traditional passive viewing from a safe distance. This puts the animals at risk of being harassed and injured.

So, care must be taken to avoid disturbing the animals, as this could interfere with their normal behaviours. Dolphins and whales are often engaged in social behaviours – they like to touch each other with their flippers and sexual behaviours are also very common. When whales and dolphins are feeding they often spend little time at the surface and when making a foraging dive they usually display their tail flukes, which indicate that they are making a deeper dive. Travelling behaviour is displayed when they swim at a constant speed in the same general direction, without evidence of feeding or social activities. Animals that remain in one area without evidence of feeding or directional movement are usually resting. They move slowly in a compact group, rising slowly to breathe while staying in the same general area. Females with young and resting animals may be particularly sensitive to disturbance from boats and swimmers. The following behaviours may indicate disturbance:

- tail-flukes slapped at the surface
- making coughing sounds
- leaping or turning away from boats
- sudden tail flukes-up of the whole group
- a startle reaction by the animals, such as sudden acceleration

Dolphins and whales may be disturbed by engine noise or erratic movements by boats and swimmers (if this option is offered). This may interfere with and reduce the time for nursing, feeding, prey detection, acoustic communication and navigation. It may also force the animals to move to less favourable areas. These disturbances will have a negative effect on the daily life of the dolphins and whales and possibly adverse long-term effects on their survival in the areas where the tourism activities take place.

There are also safety issues for tourists visiting dolphins that must be taken into account. Operators must ensure that their vessel is seaworthy and has adequate safety equipment, such as life vests for all onboard. Dolphins are wild animals and are capable of causing injury to humans if provoked. Tourists should respect this and always let the animals come to them, rather than the other way around. Guidelines have been produced (see below) for the management of whale and dolphin tourism so that that no harm or unnecessary stress is caused, and to ensure that the dolphins are not deterred from an area. Carefully managed, dolphin tourism has the potential to provide a regular and sustainable income for local communities, while helping to protect dolphins and to support education and conservation.

Above: Indo-Pacific bottlenose dolphin, Kizimkazi, Zanzibar © Fredrik Christiansen.

Guidelines for sustainable dolphin and whale tourism

In order not to disturb animals, operators should follow a code of conduct for best practice, which either can be in the form of guidelines (voluntary) or regulations (mandatory). These should be distributed and introduced to the tourists before going out on the water. Ideally guidelines/regulations should include a restriction on the number of boats allowed per group of animals and a time limit for the interaction. Any whale or dolphin watching cruise should be accompanied by a trained guide authorised by the local administrative authority.

Example of dolphin watching guidelines from Zanzibar:

- Drive the boat slowly with a steady speed. Avoid sudden changes of speed or direction and avoid reverse or going in and out of gear
- Approach the dolphin group from the rear or the side, never head on
- Do not chase dolphins, let them come to the boat instead
- Do not encircle or intersect the dolphins
- Always make sure the dolphins have an escape route when there are more than two boats
- Never approach a mother and calf
- Dolphins slapping their tails at the surface, making coughing sounds, leaping or turning away from the boat, indicate that they are disturbed. Leave them alone and look for other animals instead

Example of whale watching guidelines from Madagascar:

- The boat pilot should reduce boat speed when approaching within 800m of a group of whales.
- The boat should stop at 100m for a small group of adult whales and at 200m for a cow and calf or large group
- Only one boat should follow a group of whales at a time. A whale-watching boat should not follow a group of whales that permitted whale researchers are observing. If other boats would like to watch whales observed by another whale-watch boat or researchers, they should maintain distance of 600m away from these first boats
- The observation period should not exceed one hour
- The pilot shall parallel the course and speed of moving whales and shall not attempt to approach from head-on, the side or directly behind the whale
- Whale watchers should remain calm if whales approach the boat. The boat pilot shall put the engines in neutral and not reengage propulsion until the whales are observed to be at least 300 from the vessel
- It is forbidden to swim with or touch whales, dolphins, dugongs, and other marine mammals
- Any whale-watching cruise must be accompanied by a guide authorised by the local administrative authority representing the Ministry of Tourism

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How can we save our reefs from global warming?

By Tim McClanahan

An international team of scientists has found coral reef conservation in key regions can succeed and requires a variety of responses to successfully adapt to climate change. The Seychelles can adopt a transformational strategy that requires finding heat-tolerant corals and experimenting with reef restoration methods

Research funded by the Western Indian Ocean Marine Science Association and undertaken by a variety of partnerships, including the Wildlife Conservation Society, James Cook University, University of Newcastle, University of East Anglia, and International Institute for Geo-Information Science and Earth Observation have evaluated the state of coral reefs in the Indian Ocean and the most effective responses to adapt to climate change. The international team of scientists has found coral reef conservation in key regions requires a variety of responses to successfully adapt, depending on the capacity of people, the stress of the environment, and the ecological condition of their reef resources. Failure to understand this context will result in wasted efforts according to a paper the researchers recently published in the conservation science journal Conservation Biology.

Based on their data, collected in five countries in the Indian Ocean, many countries with coral reefs highly dependent on marine harvests may be unable to save those reefs with their current conservation measures and human capacity. The Seychelles is among this group and also among the wealthier countries with sufficient human capacity to protect the reefs but not making sufficient efforts to protect their reef from the rising problems of climate disturbances. The researchers argue that in some of the worse cases that no amount of effort will preserve reefs and a strategy of transforming or reorganizing their ecology and local economics is required. Much of

the Seychelles lies within this high stress environment but has the human capacity to experiment with restoration.

In order to come to this conclusion, the study spanned the sciences of oceanography, environmental science, sociology and economics to assess how 29 communities in 5 countries in the West Indian Ocean are expected to cope with climate change. On the whole, they found most conservation strategies in the Western Indian Ocean are poorly prepared to cope with the expected impacts, but understanding the social, environmental, and ecological context can improve the chances. The researchers found that the scale of the threat from climate change varies significantly from place to place - and that some places are more likely to be able to cope or to adapt their management than others. Consequently, the different prognosis and understanding the social and ecological context makes it more likely to find the best and avoid futile management.

For example, Kenyan and the Seychelles reefs are highly susceptible to climate change, suggesting that they are unlikely to sustain a high-quality tourist experience. Yet, these countries have a moderately large marine protected area fisheries closure systems that is highly dependent on tourism. The sustainability of this protection strategy under climate change scenarios is questionable if ecotourists find better experiences in the southern Indian Ocean with reefs less susceptible to climate disturbances. Consequently, these nations need to transform and diversify its coastal tourism and resource use to avoid the future loss of ecotourism.

In Tanzania, some sites generally have higher human capacity to adapt and lower climate change stresses, suggesting that investment in more protection could be effective. However, Tanzania currently lacks an effective system of large fisheries closures, protecting less than 2% of its reefs from fishing. Increasing the capacity of people and institutions to manage marine protected areas is a good investment in this country and more so for Madagascar, where the lowest human capacity was recorded.

Most sites in Mauritius and eastern Madagascar have low environmental stress and consequently are expected to fare better than reefs in the rest of the region - yet currently less than 1% of the reefs in these countries are fully protected from resource extraction. The large differences in the capacity of these two countries means very different management, Mauritius can develop marine protected areas soon, while Madagascar needs to develop the capacity to manage, but the opposite seems to be the case at present, according to the researchers. **The study suggests there are some reefs with a hopeful future and there are also hopeful actions that can improve the chances for their survival and economic prosperity of the associated communities. The trick is to coordinate such that the management activities match the reef's potential.**

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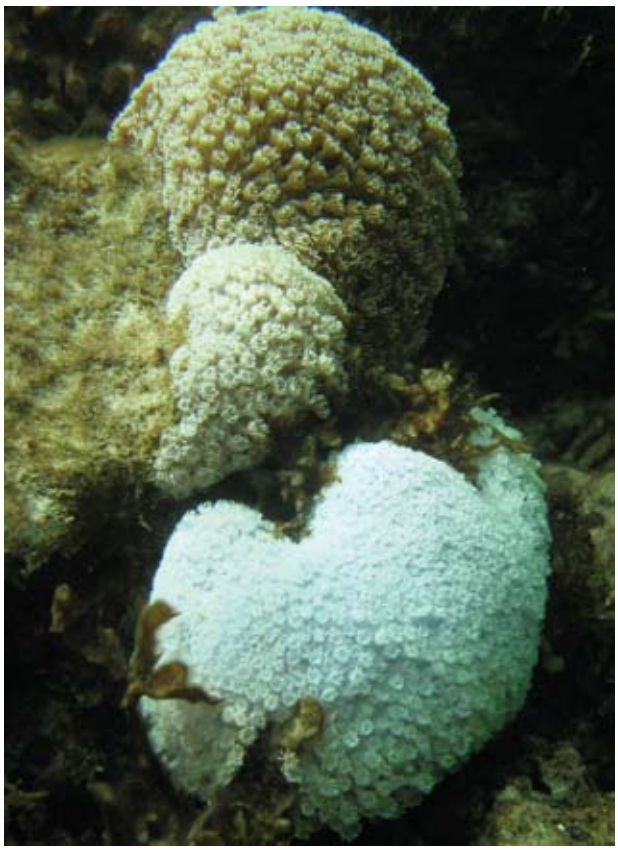


Facing page: Anemone Bleach. This page Top: Goniopora bleach, Middle: Emperor Angel Bottom: Acropora

Tim McClanahan is with the Marine Program of the Wildlife Conservation Society, Bronx, NY

Fishers managing fisheries?

By Jan Robinson

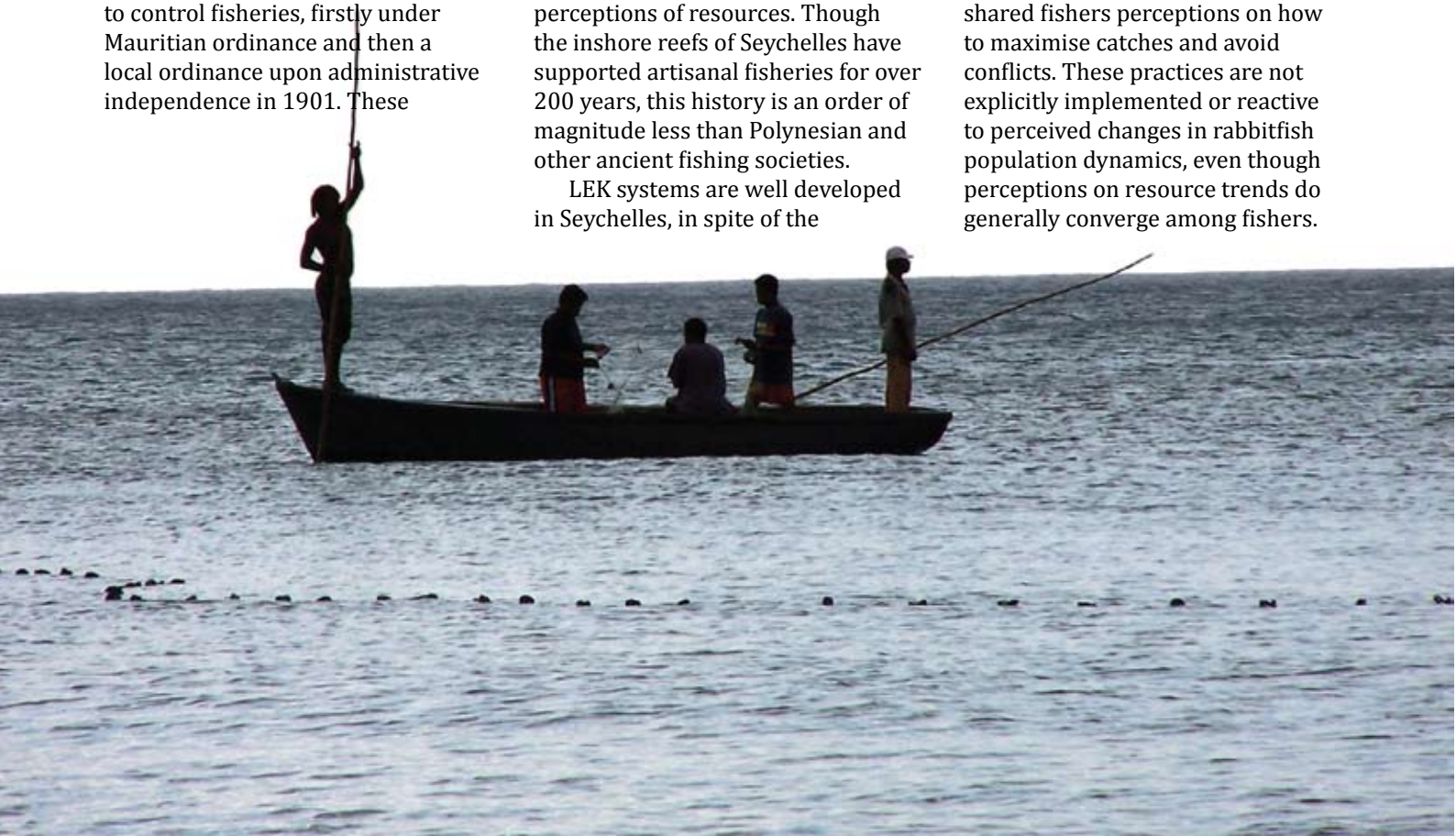
Seychelles has only been inhabited for around 250 years but the first settlers were quick to recognise and exploit the natural bounty that these islands presented. Marine resources such as fish and turtles, although exploited sporadically by seafarers for provisions prior to settlement, were now subject to small-scale subsistence and commercial fisheries. Early fishers, using traditional wooden pirogues or gathering on foot, fished for reef fish, sea cucumbers, green snail (Turbo marmoratus) and black-lip pearl oyster (Pinctada margaritifera), and by the early 1800's, a whaling station was established on Ste. Anne.

Various internal and external factors influenced the early development of fisheries in Seychelles. Of the latter, export-driven fisheries such as sea cucumber, pearl oyster and shark fisheries have been subject to fluctuations in demand and competition, while a growing international conservation ethic precipitated the demise of turtle fishing. Internally, the British Colonial government administered a series of regulatory measures to control fisheries, firstly under Mauritian ordinance and then a local ordinance upon administrative independence in 1901. These measures included net regulations, closed seasons and size limits for many commercial reef fish species, prescribed landing sites, and vessel and fishery licensing. Then, like today, laws restricting fishing were frequently opposed by fishers, under review by committees, and often difficult to enforce.

Globally, the days of top-down, government control of fisheries are waning. It is now widely recognised that, if afforded rights to exploit and manage resources, fishers tend to self regulate and adopt sustainable practices, especially when sustainability adds value to the products (and rights when licenses can be traded). This explains why management by communities/users, community-based organisations, or between communities and government in co-management arrangements, is gathering pace. In part, this paradigm shift was based on observations of indigenous fishing communities with a history of marine tenure and traditional forms of self-regulation, systems which evolved within the context of a societies' structure but were all based on millennia of local ecological knowledge (LEK) and current perceptions of resources. Though the inshore reefs of Seychelles have supported artisanal fisheries for over 200 years, this history is an order of magnitude less than Polynesian and other ancient fishing societies.

LEK systems are well developed in Seychelles, in spite of the relatively short period of time since settlement. Small-scale fishers in Seychelles have developed extensive knowledge of fish and invertebrate fauna and marine habitats and ecosystems, which is drawn upon for decisions regarding what, where and how to fish, on scales ranging from real-time to seasonal and annual. In some cases, that knowledge is being applied in the form of informal self-regulation and management, mediated through social norms.

One interesting example concerns the trap fishing community of Praslin who adopt several informal fishing practices in relation to the targeting of rabbitfish ('kordonnyen') spawning aggregations. These spawning aggregations have supported a commercial trap fishery for well in excess of 120 years with LEK generated over many generations. A variety of practices include norms on the types of traps that should be used and fishing periods restricted to daylight hours, as well as a local version of tenure in which the spawning aggregation sites are partitioned among fishers from different districts. These practices have evolved into social norms and developed from shared fishers perceptions on how to maximise catches and avoid conflicts. These practices are not explicitly implemented or reactive to perceived changes in rabbitfish population dynamics, even though perceptions on resource trends do generally converge among fishers.



Some fishers maintain that larger vessels, which can carry more traps, should not be allowed in the fishery. However, it is not entirely certain whether or not this reflects an appreciation of effort limits or represents a desire not to allow monopolisation of catch. Several important lessons emerged from the documentation of these fishing communities and the resources they exploit.

Rabbitfish are relatively productive compared to many other reef fish species and less vulnerable to exploitation. As a result, there is less potential for stock collapses and other conditions that can predispose a fishery to regulation of catch or effort. However, a number of specific, localised circumstances exist on Praslin that have also played a role in the resilience of this particular social-ecological system. Firstly, low human population pressure and abundant line fish stocks on the banks means that there has been limited pressure to expand trap fishing beyond the coastal fringe, which has maintained a natural refuge for rabbitfish populations. Secondly, only a few of the known spawning aggregations sites are intensively exploited, mainly due to market constraints – there is simply not enough demand to maintain prices. These circumstances have undoubtedly contributed to stability in the fishery and have ensured that the informal management system has not faced the sternest of tests, i.e. how to adapt to a major decline or collapse in the resource.

Combined with the biology of the species, it is not surprising that a recent assessment concluded that this fishery exhibits a degree of resilience to commercial fishing given current practices and socio-economic conditions. The emphasis is on current due to a number of emergent threats, including the degradation of coral reefs due to climate change and the impacts to local communities from the ongoing economic restructuring. Even in some of the most isolated fishing communities with a long history of traditional practices, the erosion of indigenous management systems and shifts to unsustainable practices has coincided with wider economic changes. Already, we are witnessing the expansion of trap fishing to the outer banks as fishers diversify and increase effort to compensate for higher operational costs. In the absence of management, this could signal the erosion of natural spatial refugia.

In Seychelles, the informal management systems have developed under a centralised government and a top-down form of management stemming from the colonial era. Recently, there has greater emphasis on participatory fisheries management, as enshrined in the legislation, but fishers perceive that they are consulted after the fact and their role in management is limited to advisory at best. Co-management, which constitutes a spectrum of shared responsibility between government and the users, has not developed, and Seychelles now lags behind other countries in the region in this emerging approach. Kenya has recently launched a series of fisheries co-management measures through arrangements with Community Based Organizations, such as beach management units, and a variety of similar community-based approaches are being implemented in Tanzania.

“The oft-cited observation that fishers in Seychelles are individualistic and fractious among themselves, and therefore unable to associate and engage effectively in management, is a misconception and over-generalisation”

The oft-cited observation that fishers in Seychelles are individualistic and fractious among themselves, and therefore unable to associate and engage effectively in management, is a misconception and over-generalisation. Certainly, there are forms of fishing that encourage individualistic and competitive behaviours. However, as with several other fisheries, the targeting of rabbitfish spawning aggregations is highly cooperative with fishers sharing information on the timing and strength of the events. It is under these conditions that social norms can easily arise and be maintained. Given future uncertainties at local and global scales, there is an urgent need to strengthen adaptability in social-ecological systems; in this case to enable fishers and fish to adapt to a changing environment. At present, the informal fisheries management systems in Seychelles are poorly documented and are certainly not yet recognised by Government. Attempting to impose formal, conventional fisheries management approaches on small-scale fisheries is usually counterproductive and often leads to conflicts, especially where scientific and fisher perceptions are divergent.

Co-management of Seychelles small-scale fisheries is the focus of a major GEF/UNDP programme. The challenge will be to find systems that are suited to local circumstances and that do not seek to replace the social norms and informal management systems in which they operate, but rather serve to recognise, strengthen and complement them.

In the next Zwazo, we will provide preliminary results from a SFA/Nature Seychelles scientific research programme aimed at understanding the ecological significance of resource partitioning in the Praslin trap fishery.

Jan Robinson is Manager of Fisheries Research at the Seychelles Fishing Authority, currently working on stock assessment, ecosystem approaches, and fish behaviour and fish sex!

Using images to conserve endangered species

By Claire Jean

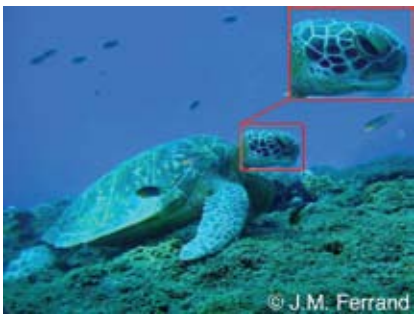
Identifying individual animals over a period of time can provide information on population size, and individual survival amongst other things and as such is a key tool for conservation.

But, identifying animals that look alike is not that simple.

Marine turtles have been studied for many years and identified by using marking tags on flippers, giving each individual a unique number allowing easy recognition. This method requires physical capture of the animal, and so, the easily accessible part of the population is nesting females who come ashore to lay their eggs and can thus be tagged on the beach. In some places juveniles can also be caught on the reef flats for tagging and weighing by using the "turtle rodeo" or "turtle jumping" technique, which consists of jumping on the turtle from a boat that follows her. Mature adult males, however, are pretty much inaccessible not only because they occur in deeper waters, but also swim much faster and weigh significantly more, making it hard to catch them for weighing, measuring and tagging.

Given these limitations, a number of organisations around the world have looked at ways of using photographs, rather than marker tags, to identify individual turtles. Photo ID has already been used to identify marine animals such as whale sharks, humpback whales or dolphins. This technique is non-intrusive, less costly and less stressful than the capture and tagging method. It is particularly useful in places where marine turtles cannot be caught and tagged and helps in situations where tags are lost. It also targets all turtles unlike the capture method, which mostly targets females and juveniles. It can be used in all habitats either at sea or on the beach. However, this technique do not allow for measuring other biologic parameters such as growth.

Kelonia, the Marine Turtle Observatory of Reunion Island, in association with the Information Technologies department at the University of Reunion, have recently developed a photo-ID method based on the use of facial profile photographs of green and hawksbill turtles. As each individual does not display the same scale pattern in the right and left facial profiles, both sides are used to characterise each individual whenever possible. Each facial profile is transformed by visual inspection into a code that describes the scales on the turtle's head located posterior from the eye to the neck and from the line of the upper jaw to the top of the turtle's head. Profile images can therefore be used to identify individual turtles, in the same way fingerprints are used for humans.



A database was developed to manage photographs and sighting reports, using the images converted by visual inspection or "fingerprints". The crossing of new data with those of the database allows establishing whether or not each marine turtle has been seen previously. Once the image is fingerprinted, an automated search routine compares the "new" individual to the records held in the database. The best matched images in the database are presented in descending order of similarity, thus reducing the number of photographs to be compared. Then, final visual comparisons of new images with those selected by the system in the database establish whether a marine turtle has been sighted previously or not.

Photo-ID can become extremely tedious and prone to subjective errors when large catalogues of images are being processed and matched manually, thereby

inducing a loss of accuracy. The technique presented here is based on a non-subjective process, with a computer-assisted sorting routine, albeit requiring personal training to assign accurate profile codes to each photograph. It allows streamlining of the search for any particular individual to a maximum of ten images selected from the database according to the numerical correspondence of the input profile code. Unlike many automated image identification systems, which require standardized photographs with particular inclination and resolution, this method allows the use of a wide range of photographs, as long the entire profile is visible. Special fieldwork and training for photographers is not required. The participation of scuba divers is a great opportunity to collect images over time and across a broad range of locations, allowing continuous and long-term studies. It is also a good way to increase public awareness for the conservation status of these endangered species.

Results from Green turtles photographed by divers around Reunion, Mayotte and Glorieuse islands have shown that individual animals can be reliable identified in their foraging grounds using this method.

To date around Reunion Island, 80 Green turtles have been identified by researchers at Kelonia, with at least 16 individuals being re-sighted a few months later, and 23 Hawksbill turtles have been identified with at least 3 being re-sighted. Photographs of turtles in Seychelles, submitted by Marine Conservation Society, Seychelles have added an additional 36 Hawksbill turtles to this Indian Ocean database.

Claire Jean is Project Officer at Kélonia, the Marine Turtle Observatory of Reunion, for the development of a regional database and geographical information system for marine turtles in the south-west Indian Ocean (TORSOOI project), and works on aerial surveys and photo identification of marine turtle populations on Reunion

Climate Watchmen

Turtle nest temperature project

By Mary Ledlie

Photo: A data logger is put into a nest during laying

Cousin Island is one of the most important nesting sites in the western Indian Ocean for the critically endangered hawksbill turtle. They nest here between August and February and intensive monitoring takes place during this period to collect as much information as possible to inform the conservation management of this species.

The turtle monitoring program on Cousin is based on regular beach patrols being carried out around the island to intercept, and collect data on, as many turtles as possible. Tags applied to the turtles' front flippers are used to identify individuals and to provide an estimate of the size of the nesting population. Other information such as the size of the turtle and tracks are also noted and the location of any nests are marked and recorded.

This year we have an additional dimension to the turtle monitoring program; in collaboration with Kelonia Marine Turtle Observatory in Reunion, we're looking at the temperature inside the turtle nests as this is known to determine the sex ratio of hatchlings. Warmer temperatures produce more females and cooler temperatures give more males. This is an important area of study and with rising global temperatures, it is important to understand the potential impacts of climate change on this critically endangered and thermally sensitive species.

To investigate nest temperatures on Cousin Island, data loggers have been placed within nests at the time of laying and these will record the nest temperature at hourly intervals. The incubation period for hawksbill turtles is about 60 days and it is the temperature within the middle third of this period that determines the sex of the hatchlings. Nests will be closely monitored around the time of hatching and the number of hatchlings will be recorded. The nest will then be excavated and the data logger will be removed so we can download the data and determine the approximate sex ratio of the hatchlings.

Marie Ledlie is a volunteer with Nature Seychelles assisting with turtle and reef monitoring

A Viral network of positive change!

By Peter Chadwick

The Living Waters Unit is one of the three units within WWF-SA (the others being Living Lands and Living Planet). This unit has been driving for catalytic change in the marine and freshwater environments, guided by its vision which states: "Government, civil society and the private sector work together to build a future in which healthy aquatic ecosystems underpin the sustainable development of South Africa and enhance the quality of life of all its people."

As the Living Waters Unit's partnerships with government, the private sector and civil society grow and mature, we are noticing a very interesting phenomenon. Can you imagine a virus that spreads through a population, from individual to individual, but instead of incapacitating its hosts, the virus makes its hosts stronger and more robust by changing the behaviour of the host for the better?

This could be one way of describing the type of change we are noticing in the networks developed by the Living Waters Unit of WWF-SA. Founded on a fundamental relationship with Sanlam and a long standing relationship with Mondi (two major players in the South African corporate sector), the partnership has been able use this foundation to demonstrate success on the ground and build the confidence for further partners to invest. The Partnership now enjoys support from six 'primary partners': Sanlam, Mondi, South African Breweries Ltd, Pick n Pay, Honda Marine, and De Beers. Importantly, all these partnerships now extend well 'beyond the chequebook', and include strong environmental sustainability and joint marketing and communications components. Most significantly though, these 'primary partnerships' are enabling the development of further 'secondary partnerships' through associated businesses and suppliers.

The Honda Marine Parks Story

Marine Parks (or Marine Protected Areas – MPAs) are a cornerstone of South Africa's marine conservation and are therefore a significant focus area for the Living Waters Partnership. Our original successes in this area were made possible through a bequest by Mr Alfons Hacker.

These successes soon attracted the attention of government, who entered an MOU with WWF to co-finance Marine Park activities, and the Cape Action Plan for People and the Environment (C.A.P.E), who asked WWF to manage the marine component of this internationally funded programme.

Building on this successful body of work, WWF was able to approach Honda Marine to become a primary partner of this important body of work. Today this partnership encompasses financial, hardware (marine motors and vehicles), sustainability, and communications components. Importantly, marine businesses associated with Honda Marine are now also interested in becoming involved in this work, leading to budding partnerships with other companies in the boating related industry. This is a classic example of how we have been able to grow a network of partnerships around a successful body of work. Over the last two years, the partnership with Honda Marine has provided five Patrol boats for South Africa's MPA's and another is currently being built. These acquisitions have made it possible for personnel working in these parks to increase their monitoring and law enforcement efforts which have in turn improved the management of the protected areas; a win-win situation for all and proof that partnerships work!

Peter Chadwick is the programme manager for the WWF-SA Honda Marine Parks Programme which aims to support and improve MPA management in South Africa and the Sub-Region

Adaptation to situation: how the Mombasa Marine Park in Kenya is doing it

By Dr. Jennifer O'Leary and Arthur Tuda

The marine areas under the Kenya Wildlife Service (KWS) protect incredible biodiversity and are a natural and cultural resource for the people of Kenya and the world. Though these areas are protected, they must be actively managed because they are threatened by changing environmental conditions and external pressures. For example, coral reefs world-wide are at risk of bleaching and death because of global warming, and taking action to reduce the risk of bleaching is a management concern. Similarly, marine and terrestrial parks can be threatened by activities beyond their boundaries such as overharvest and pollution. For example, overfishing outside park boundaries can prevent recovery within small marine protected areas as fish are mobile. Thus, simple closure of an area is not enough to ensure long-term ecological sustainability. Effective and sustainable management must include continual assessment of conditions and active response to threats.

KWS has launched an innovative project in Mombasa to develop an adaptive management program. The program fundamentally changes the way the KWS manages its marine resources. It provides strong links between science and management and allows active management response to threats as they occur. The Mombasa program is a pilot that will be used as a model for other marine parks in Kenya. The program is being developed by a postdoctoral researcher from the American Museum of Natural History (Dr. Jennifer O'Leary) and Senior Park Warden (Arthur Tuda).

Adaptive management is a decision making process where conditions are continually monitored to determine whether management is successful in meeting objectives. Thus, the first step in adaptive management is to define success with objectives. Once objectives have been established, park conditions are monitored via surveys of park ecology and human use patterns. If monitoring results indicate that objectives are met, the current management is effective and monitoring continues (because conditions can change). If objectives are not met, then new management strategies must be employed. Once a new management strategy is in place, results of ongoing monitoring indicate if the strategy has improved conditions and helped progress toward the stated objectives. The key feature of adaptive management is strong feedback between monitoring (data) and decision making in a process of "learning by doing".

Mombasa marine park rangers have been trained in park ecology, management principles, data collection (for missing data), and data entry. The trainings have been hugely successful and have integrated the entire park community in the adaptive management process. A bulletin board has been established at the Mombasa Marine Park with a full program description, graphs of indicator trends, and reviews of training courses. The bulletin board will be updated periodically so that the park community can identify potential threats as they occur and work to develop solutions.

The program will commence in February 2010. The rangers and coastal KWS staff are extremely excited about this initiative, and view it as an example of "conservation in action!" The program will make KWS a leader in practicing active management in protected areas.

Dr. Jennifer O'Leary is a postdoctoral fellow with the Center for Biodiversity and Conservation of the American Museum of Natural History. She did her Ph.D. at the University of California (USA)

Arthur Tuda is an MPA manager in Kenya with over 9 years experience in MPA management. He did his Msc in Water and Coastal Management at the University of Plymouth, UK

In Hot Water: Seychelles Ocean Temperature Network provides data

By Liz Mwambui

A network of national and international agencies in the Seychelles led by the Seychelles Fishing Authority and including Nature Seychelles, have joined together to form the Seychelles Ocean Temperature Network (SOTN) to monitor ocean temperatures at selected sites in the Seychelles archipelago. For over a year now data has been collected at sites that include far flung outer islands like Aldabra and inner islands such as Cousin Island. The data - retrieved from data loggers deployed at these sites - is now accessible on the Seychelles Ocean Temperature Network website (http://sfa.sc/Index2.htm).

The project was started to help increase knowledge and build capacity to respond to climate-driven changes in the oceans. In 1998, the Seychelles was among sites in the Indian Ocean severely affected by coral bleaching caused by warm waters. The event adversely affected many of the Seychelles reefs resulting in around 90% coral death. In order to understand the effects of such a dramatic episode, extensive reef science research is being carried out. Ocean data temperatures are useful for such research but are also being applied to other studies such as on reef fish, turtles, sea birds and whale sharks.

Prior to this, ocean temperature data were collected to meet specific needs of projects and agencies and were scattered among these groups. Coordination was therefore required to bring this data together and monitor as much of the archipelago as possible. The network has helped in selecting and installing temperature data loggers at selected locations.

"Ocean temperature data is very useful in our own activities such as coral reef and turtle nest temperature monitoring," says science coordinator for Nature Seychelles David Derand. "In case of coral bleaching event, we can now immediately check if such adverse phenomenon is actually related to sea water temperature increase in coastal waters around Cousin. Regarding turtle nest temperature monitoring, we can already relate the incubation temperature within the nest, which determines the proportion of male/female hatchlings (hatchlings sex-ratio) to the air temperature recorded by automatic weather station installed on Cousin. The automatic recording of ocean temperature is a step forward that will allow us to also try to correlate it with turtle nest incubation temperature, thus improving future prediction of hatchling sex-ratio."

The website continues to evolve to provide improved data access for partners and more information for the public.

The project and the network have also built capacity for monitoring and assessing short term climate impacts on the marine ecosystems of Seychelles. A recent study of the effects of past coral bleaching and the susceptibility to future impacts has highlighted Seychelles as one of the most vulnerable locations in the western Indian Ocean. (see related story: p 20-21). But it also says that compared to many other countries in the region, Seychelles has high capacity in terms of coping with changes to marine ecosystems. It recommends sustained efforts to protect reefs from the rising problems of climate disturbances.

Bioshields: a case for large scale mangrove conservation

By Nirmal Shah

A scientific study published in 2009 in the Proceedings of National Academy of Sciences has shown that mangrove forests can act as living barriers known as "bioshields" against the effects of cyclones and effectively reduce the damage that these events typically cause. The study examined the so-called 'super cyclone' that ravaged Orissa state in eastern India in 1999, killing about 10,000 people. The study found that, taking other factors into consideration, the villages with the widest mangrove belts had fewer deaths as compared to those with narrower or no mangroves at all.

This is good news for those advocating the conservation of mangroves such as the regional project called Mangroves for the Future which stretches from Asia to Seychelles and is funded by the Clinton Foundation, among others. The project was initiated after researchers examining five villages in 2005 claimed that villages without mangroves were completely destroyed by the Boxing Day Tsumani, whereas those behind the mangrove suffered no destruction. But research led by Andrew Baird of Australia has shown there is no real evidence that this actually happened. A new report from the United Nations Environment program (UNEP) shows that "bioshields' such as mangroves seem to have negligible effects against tsunamis.

There are fundamental differences in the waves created by tsunamis and cyclones. Cyclones cause sea waters to rise up and form a storm surge up to 8 meters high. The energy of the waves are mostly near the water surface. The new study form India has found that mangroves can indeed reduce the energy and velocity of storm surges of this type, but tsunami generated waves wave can reach heights up to 20 meters and its not clear that mangroves or costal forests can break the force of such huge waves.

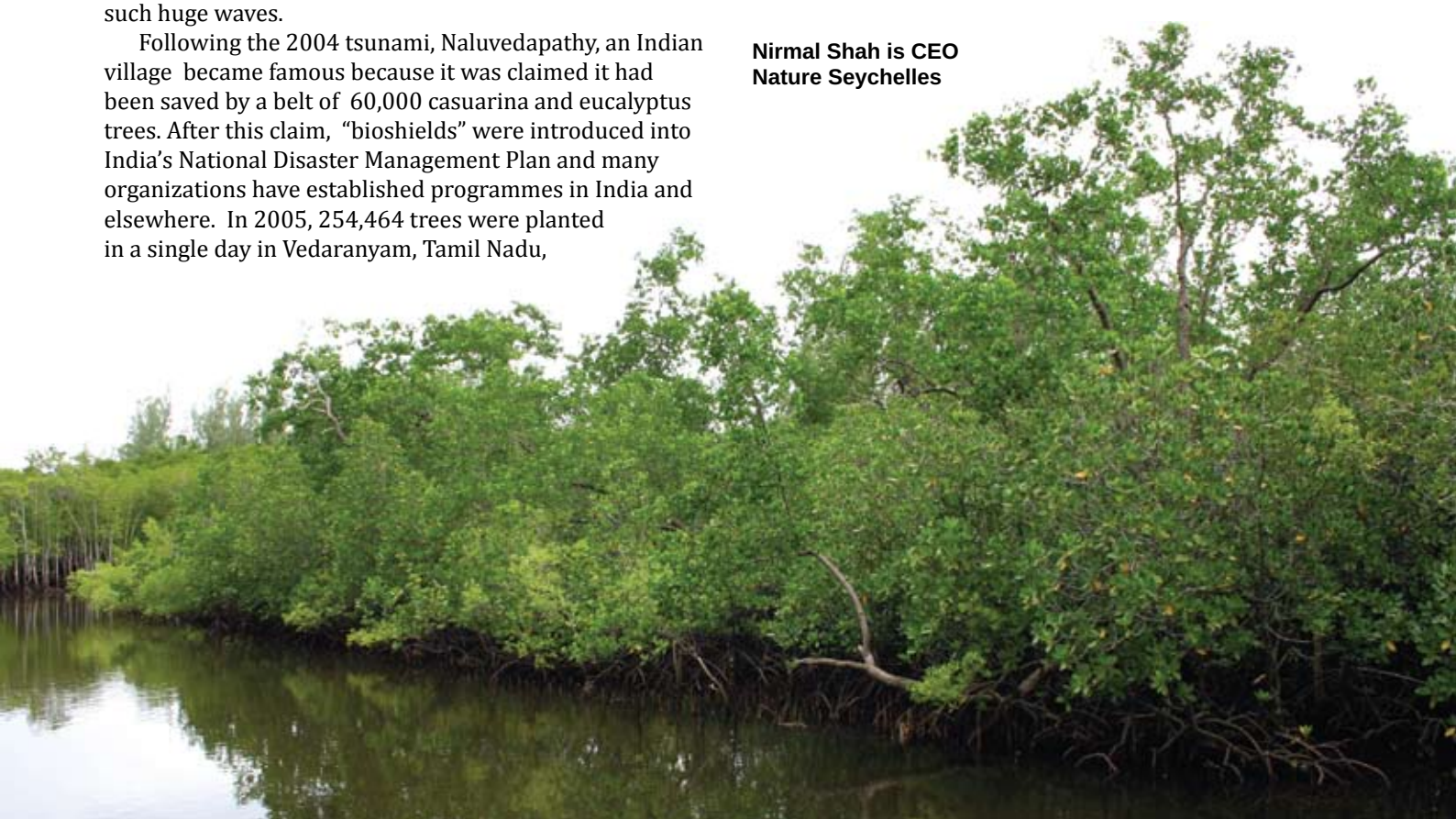
Following the 2004 tsunami, Naluvedapathy, an Indian village became famous because it was claimed it had been saved by a belt of 60,000 casuarina and eucalyptus trees. After this claim, "bioshields" were introduced into India's National Disaster Management Plan and many organizations have established programmes in India and elsewhere. In 2005, 254,464 trees were planted in a single day in Vedaranyam, Tamil Nadu, and the World Bank's Emergency Tsunami Reconstruction Project has provided funds to plant more trees.

Following the controversy of the "Tsunami bioshield" concept, Mangroves for the Future shifted its early focus to being more integrated into broader coastal management which is a good thing in itself as it provides the basis for good governance and sustainability. Other projects advocating mangroves as living barriers have also become more cautious in their claims.

In the central Seychelles islands mangroves are so reduced compared to their original state in the past that they could have never formed an effective "bioshield" against the Tsunami. But based on this latest study in the Proceedings of National Academy of Sciences, coastal planting and large scale restoration of costal forests is extremely useful against some of the effects of climate change. Storm surges are expected to rise in the face of global warming. It is anticipated that the frequencies and impacts of cyclones will be greater in the near future and that Seychelles will be in harms way. We should start now to put our own "bioshields" in place. And there are several guidelines available on how to undertake this.

Iowa State University in the US has developed guidelines at the request of the FAO for rebuilding coastal forests in Asia to act as "bioshields". Computer model and previous experience on "flow through living barriers" were used. The suggested guidelines include planting trees as close to the sea as possible; using short salt-tolerant and sparse shelters on the seaward edge; using tall species of high wind resistance on the landward side; and leaving gaps between rows and irregularly within the rows to extend the protected zone, but allowing for onshore flow of the cooling sea-breeze.

Nirmal Shah is CEO
Nature Seychelles



Strange creatures in the Sea

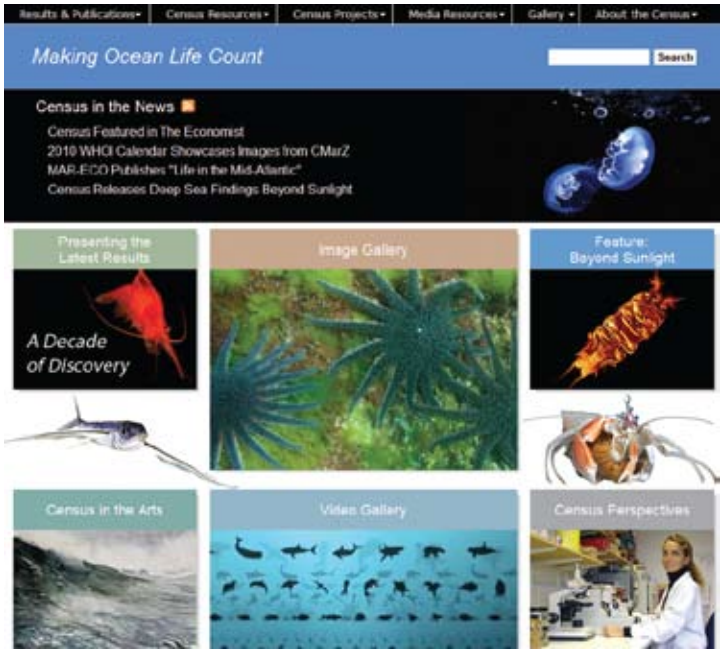
By Liz Mwambui

Scientists working on a global marine census recently laid bare strange and intresting creatures that inhabit the sea beyond sunlight. The team of scientists working on a decade-long project dubbed "The Census of Marine Life" have been cataloguing the oceans' inhabitants to determine what lives in the oceans now, what was there and what might be found in the future. By 2008, the project involved some 2,000 scientists from 82 nations collecting historic and other data globally, including from institutions in the Seychelles. Nature Seychelles' CEO Nirmal Shah was a member of the Steering Committee of the Census of Marine Life - Indian Ocean.

The census revealed an abundant and diversity-rich deep sea, that contradicts the belief that the "abyss" is of no great significance. "There is both a great lack of information about the 'abyss' and substantial misinformation," says the Team's Dr. Carney. "Many species live there. However, the abyss has long been viewed as a desert. Worse, it was viewed as a wasteland where few to no environmental impacts could be of any concern. Mine it, drill it, dispose into it, or fish it – what could possibly be impacted? And, if there is an impact, the abyss is vast and best yet, hidden from sight."

Five of the Census' 14 field projects plumb the ocean beyond sunlight, each dedicated to the study of life in progressively deeper realms – from the continental margins (COMARGE: Continental Margins Ecosystems) to the spine-like ridge running down the mid-Atlantic (MAR-ECO: Mid-Atlantic Ridge Ecosystem Project), the submerged mountains rising from the seafloor (CenSeam: Global Census of Marine Life on Seamounts), the muddy floor of ocean plains (CeDAMar: Census of Diversity of Abyssal Marine Life), and the vents, seeps, whale falls and chemically-driven ecosystems found on the margins of mid-ocean ridges and in the deepest ocean trenches (ChEss: Biogeography of Deep-Water Chemosynthetic Systems).

In a November 2009 press statement, the scientits presented species that have never known sunlight collected from the deep sea. These are creatures "that somehow manage a living in a frigid black world down to 5,000 meters (~3 miles) below the ocean waves", says the release. Among them is a jumbo "Dumbo" - a rare, primitive animal known as cirrate or finned octopod, called "Dumbos" because they flap a pair of large ear-like fins to swim, akin to the cartoon flying elephant. Nine species of gelatinous "Dumbos" were collected on the Mid-Atlantic Ridge, including one that may be new to science.



According to the census, the animals known to thrive in an eternal watery darkness now number 17,650. They range from crabs to shrimp to worms. "Most have adapted to diets based on meagre droppings from the sunlit layer above, others to diets of bacteria that break down oil, sulphur and methane, the sunken bones of dead whales and other implausible foods." The scientists say.

The decade long "Census of Marine Life" will end in October 2010 but its story is already presented in a new book titled, "World Ocean Census: A Global Survey of Marine Life". The book is organized by oceans past, present and future. Information dating back 500 years or more is gleaned from old whaling logs, scientific expedition records and even old restaurant menus that provide snapshots of species exploitation. Such records can offer a baseline for conservation targets. Special sections, for instance, tell of the widespread loss of bluefin-tuna stocks.

The "Census of Marine Life" was supported by private sources and government agencies the world over. It involved the use of deep-towed cameras, sonar and other technologies as well as expeditions to several sites. A website, the Ocean Biogeographic Information System (OBIS, www.iobis.org), contains the Census inventory and database. Users will be able to click on maps of the oceans anywhere in the world and bring up census data on what lives in that ocean.

Liz Mwambui is Nature Seychelles' Communication Manager

World class staff for world class conservation:

Meet Giles-David Derand

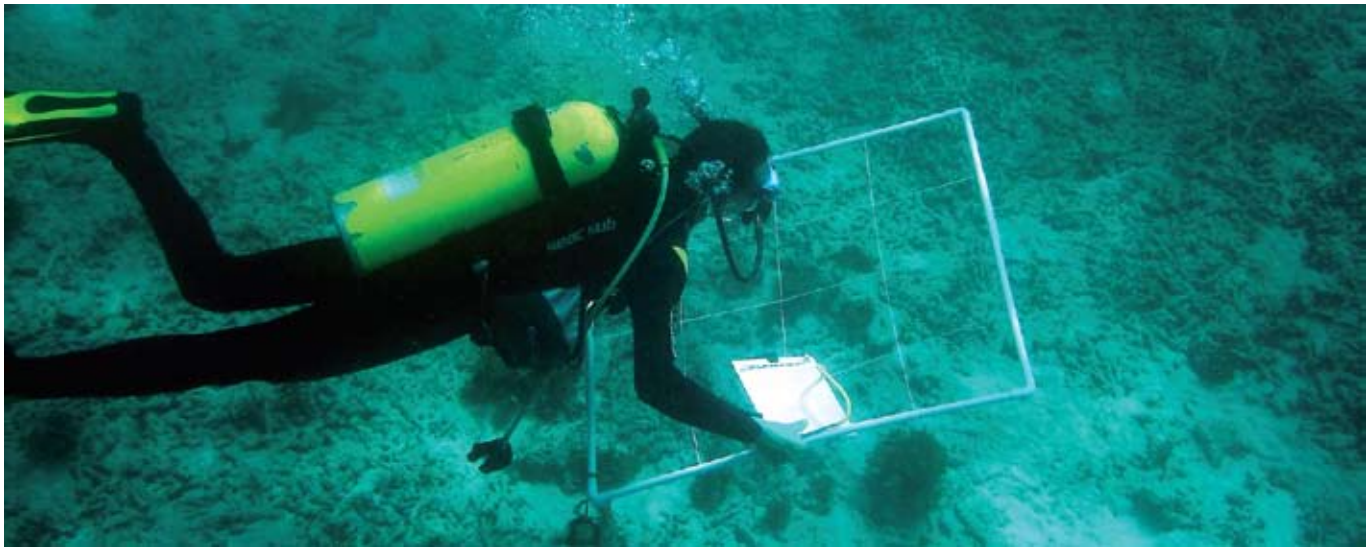


Photo: David, centre, with colleagues Mary and Eric and top, partcipating in coral reef monitoring on Cousin

Gilles-David Derand is Nature Seychelles Science Coordinator. He joined Nature Seychelles in October 2008 from Toulouse France.

David's competencies range from Project development, work plans, fundraising and budgets management, networking, meetings organization. Coupled with these he is well versed in Coastal and marine habitat survey, environmental impact assessment, scientific data collection and analysis, GIS mapping, and database design. In his past work experiences, he was also very involved in environmental education, communication, staff training and management.

"I take it as a big honour to be entrusted with such an arduous task of leading Nature Seychelles world class scientific initiatives which have seen it scooping international awards and putting the Seychelles not just on the world map." Says Derand

Before joining Nature Seychelles Derand worked with Spot Image in Toulouse. He also previously served in senior positions in his native Reunion. Between 2003 – 2005 he was the Head of the Environmental Unit of the Reunion Chamber of Agriculture, where he designed and developed organic farming at regional scale, implemented diagnosis to reduce water pollution by nitrates and pesticides and coordinated environmental surveys on the establishment of terrestrial and marine protected areas.

He also served as the Head of education and awareness at the Reunion Marine Park. Derand is well educated holding two graduate degrees. Last year he graduated with an MSc in Marine Environmental Protection from the School of Ocean Sciences, University of Wales Bangor (UK). Under this degree Derand is well acquainted with multidisciplinary training including coastal habitat ecology and survey, environmental impacts, Integrated Coastal Zone Management, and he has conducted extensive research on the coral community structure of the Chagos archipelago using video data. He also has an MSc and BSc in Plant Biology, Ecology and Chemistry from the University of Perpignan, France. Coupled with these Derand has a string of post graduate and engineering diplomas on tropical agronomy.

Being a native of Reunion, Derand is at home with the dynamics of Small Island Developing States, and he is also very familiar with NGOs, being a trustee of SREPEN (Reunion Society for Environment Study and Protection) and also involved with SEOR (Reunion Ornithological Society) and Blue Ventures in Andavadoaka (South-West Madagascar).

Widely travelled in East and Southern Africa, Derand is no stranger to Seychelles, having been here before and visited Cousin, Aride, Bird and Aldabra in the early 1980s. He is a qualified Scuba diver, and passionate about seabirds, turtles, coral reefs and much more…

John Collie leaves us

John Collie passed away at the Ayrshire Hospice, Ayr, Scotland at 11:10 am on December 30th 2009. John, a popular and well known personality in Seychelles was active in conservation for many years. He had been ill for at least two years with cancer but was misdiagnosed as coeliac disease a year and a half ago. Therese, his wife informed us that John had came out of the hospice on Christmas eve to be with his family for Christmas Day. He returned to the hospice on Boxing Day but his health had significantly deteriorated.

John started his career as conservation ranger in Ayrshire Scotland where he had grown up and subsequently became a teacher of combined science in Seychelles. His passion for conservation drew him to Aldabra where he was the general manager from 1983 to 1984. John went through various trials and tribulations on Aldabra. But the atoll had woven its magic around John and he returned there for some time again as the general manager in 1987.

From 1988 onwards John had to provide for his family and not finding work in what was then a very small conservation department he worked at the National Travel Agency as the Operations Manager for 4 years.

Nirmal Shah recalls "I ran across John him at the NTA desk in 1990 and at the time I had been given the responsibility of developing the new Conservation and National Parks service. I felt he was wasting his skills outside the conservation field and I recruited him as Conservation Officer in 1991, an important national position at the time".

Friends say that John was really contented during his time as Conservation Officer. Nirmal Shah says, "John and I spent a lot of time together as our Division was in an exciting stage of growth and development. He played a key role in conservation in Seychelles".

The Conservation and National Parks service was broken up by 1994 and John became the Director of Conservation and Marine Parks By 1997, the organization that Nirmal and John had been developing in the early 1990's called the Biodiversity Agency was set up but as the Marine Parks Authority (MPA) and John was made the Managing Director of this new agency based on Ste. Anne island.

With large hotel developments envisaged on St Anne and the planned relocation of the MPA headquarters John grew disenchanted and returned to Scotland in 2002. He became the Area Officer for Scottish Natural Heritage which mostly involved assessing the impact of any kind of development on the natural environment of the South Ayrshire area, an area he grew up in and his colleagues said he felt passionate about protecting.

John leaves behind he wonderful wife Therese and two children Ginny and Megan.

Photo: John Collie (centre) with Nirmal Shah and Seychelles Consul to Japan Dr Watnanabe at the International Whaling Commission meeting in Kyoto

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Seychelles Kestrel
Falco araea

Leaf Insect
Phyllium bioculatum

Seychelles Magpie-Robin
Copsychus sechellarum

Pitcher Plant
Nepenthes pervelli

Scops Owl
Otus insularis

SeyBrew
Beericus Deliciousi

Sooglossidae frog
Sooglossus gardineri

Giant Tenebrionid Beetle
Polposipus herculeanus

Distinctly Seychellois

Since 1972, SeyBrew has been the most enjoyed beer throughout the islands of Seychelles. Brewed and bottled by a 150-strong team of Seychellois professionals, using the finest ingredients imported from three continents, SeyBrew is more than just a beer - it's an institution. A symbol of national pride. An icon that, to this very day, remains distinctly Seychellois.

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lager
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