



New tidal app makes planning much easier on Aldabra



Low tide in the lagoon at Aldabra © Fotonatura

Aldabra's tide tables have, for a long time, been dependent on data collected elsewhere in the region, a situation which is far from ideal where tides dictate all life on the atoll. Aldabra has foiled several attempts to collect local tidal data but, since the installation of a new tidal gauge in 2015 and now with a year's worth of data, a new model for the tidal range of Aldabra has been developed.

The power of the ocean is clearly seen in the daily tides of Aldabra. These tides shape the atoll's coastal biodiversity and influence the behaviour of millions of marine organisms. In every ebb and flow of Aldabra's tide, more than 100 million m3 of water flow in and out of its lagoon, which is enough to fill one swimming pool for every person in Seychelles and have some left over! As any seasoned sailor knows, tides dictate local currents and the times at which coastal navigation is possible. This has a significant effect on the research and monitoring programme at Aldabra so accurate predictions of the tidal pattern are essential.



Screenshot of the tidal app © SIF

Despite their significance, measuring and predicting tides is not straightforward. Tides are caused by the changes in the gravitational forces that the moon and sun exert on the earth. The earth completes one spin on its axis every 24 hours and the moon orbits the earth once every 25 hours, which is why we see a high and a low tide roughly every 12 hours. Further complications stem from the distances between the moon, sun and Earth not being constant and the fact that the Earth is tilted on its axis. The underlying topography of the ocean can also drive tidal currents and fluctuations. All these factors explain why some months have particularly high or low tides, and also why at some latitudes tidal changes are seen only every 24 hours instead of 12.

Aldabra has a large tidal range and a semi-diurnal tide system which means it experiences two high and two low tides of approx. equal size every day. Each month there are two extra-high spring tides which occur when the sun, moon and Earth are in alignment at the time of a new or full moon. For many years the Aldabra research station has used tidal charts from Mayotte as there were none available specifically for Aldabra. The tidal gauge installed



SIF CEO attends 3rd UNESCO World Heritage Marine Site Managers conference



A sea lion in the Galapagos © Andreas B. Krueger

SIF CEO, Dr Frauke Fleischer-Dogley, attended the 3rd UNESCO World Heritage Marine Site Managers conference in the Galapagos Islands this month.

UNESCO brings together the international network of marine site managers every three years to discuss common challenges that the sites face and collaborate on solutions to combat them. Since the first marine site was inscribed on the UNESCO World Heritage List in 1982, the network has grown to encompass 49 sites in 37 countries that stretch from the tropics to the poles. The 49 World Heritage marine sites are among the most studied ocean areas on the planet and are living laboratories for research and innovation.

This year the central themes of the conference were climate change, sustainable fisheries, and collaboration. At the conference, the marine site managers were joined by leading experts including Dr Daniel Pauly of the University of British Columbia, Dr Martin Visbeck of GEOMAR Helmholtz Center for Ocean Research, Dr Paul Marshall from the University of Queensland, Dr Lara Hansen from EcoAdapt, Enric Sala, National Geographic Explorer in Residence, Brian Sullivan from Google Oceans, and Sven Lindblad of Lindblad Expeditions, whose ship, the *National Geographic Endeavour* hosted the conference. Together this network of marine site managers has the opportunity to instigate change on a global scale and through sharing their success stories, this change is attainable.



SIF CEO Dr Frauke Fleischer-Dogley (left) working with other site managers at the conference © Andreas B. Krueger

Aldabra was chosen as an example of best practices in World Heritage Site management and SIF's CEO was invited to share SIF's experience on how to adapt to the effects of climate change through innovation and science. The recent global coral bleaching event was taken as an example and Dr Fleischer-Dogley explained that without the implementation of a rigorous marine monitoring programme three years ago to understand the



World Tourism Week at the Vallée de Mai



The lucky first ten entrants to the Vallée de Mai on their complimentary birdwatching tour © SIF

This year World Tourism Week was celebrated from the 26th to 30th September under the theme "Tourism for All". This theme aimed to highlight the importance and benefits that universal accessibility to tourism has and can bring to society at large. To commemorate this week SIF organised a series of interesting and interactive activities for visitors to the Vallée de Mai. The first 10 visitors on Monday morning were presented with a necklace made of frangipani flowers and given free entrance tickets to the Vallée de Mai reserve. In addition that same group of visitors were invited to enjoy morning tea at the Vallée de Mai Kokosye cafe, a bird watching tour at Glacis Noir and free guided tour of the Vallée de Mai reserve all free of charge. What a great start to tourism week!!



Visitors during World Tourism Week taking part in a game on the black parrot © SIF

Throughout the week there was also a number of other activities on offer, including the 'Guess the weight of the Coco de Mer' game, 'Guess the age of the Seychelles Black Parrot' game, a special promotion in the souvenir shop, and other local specialities were on sale at the Kokosye café. The local authors of the book "Flora of Seychelles", Mr Steen Hansen and Mr Victorin Laboudallon, were also present at the Vallée de Mai visitor centre to sign copies of their book purchased by visitors at the souvenir shop.



In May 2015 on Aldabra's outer reef precisely measures the distance between the sea floor and the ocean's surface. With over a year's data now collected, one of our research volunteers, Fernando Cagua, has constructed a tidal model and online app that allows us to predict the local tides with a much higher accuracy. This app will make it much easier to plan research activities on Aldabra and understand how Aldabra's fauna is influenced by the tides.

Aldabra's subsistence fishing activities reviewed



Staff collecting data on a subsistence fishing trip © SIF

With its isolated location and hostile environment, Aldabra's productive waters and associated fish communities have historically been protected from the degradation associated with high fishing pressure that has impacted many reefs throughout the Indian Ocean. In its 2015 report to the Government of Seychelles, the National Geographic Pristine Seas team estimated fish biomass in the near shore waters surrounding Aldabra to be 5 tonnes per hectare, more than ten times the fish biomass found in the Seychelles inner islands. Aldabra's abundant and diverse fish life is a fantastic example of the structural complexity of a near-pristine marine ecosystem, with species from all trophic levels represented as well as some of the highest apex predator biomass found in the Western Indian Ocean.

Aldabra's small subsistence fishery has supported the SIF research station for the past four decades. Fishing takes place with baited hand lines or lines trolled at low speeds behind a boat. No trapping, shore or spear fishing takes place to avoid targeting the herbivorous species that are crucial for reef health. Fishing is not permitted by anybody not working for SIF on Aldabra. The monitoring and management of the fishery is tightly controlled to ensure that these practices are sustainable and remain in keeping with Aldabra's unique values and protected status.



New zoning map for Aldabra © SIF

The subsistence fishing activity has been the subject of a review over the past few months in tandem with the development of Aldabra's new management plan. Part of this new management plan is to introduce a zoning system to the protected waters of Aldabra with designated fishing areas known as 'Food Security Zones'. All other areas will then be categorised as 'No Take Zones'. This will provide areas for the large, long-lived, slow-growing species that are at risk from even very low fishing pressure. During the review, the monitoring methodology has been updated by research volunteer Rosie Gordon, and a new automated on-board data collection app and database have been developed to facilitate data collection, and enable immediate analysis of any changes and trends in Aldabra's subsistence fishery.

SIF remains committed to ensuring that Aldabra's subsistence fishery has as little impact as possible on Aldabra's marine ecosystem. This review is just one of the measures taken to ensure that management practices are continually reviewed and adapted to attain this objective.

marine monitoring programme three years ago to understand the distribution of the different habitats and coral species, it would have been much more difficult to assess the extent of the bleaching. These research programmes can be expensive however, and require managers to think 'outside of the box', e.g. by establishing collaborations and exploring smart technology to reduce the overall costs of research. Dr Fleischer-Dogley also recommended that external funding can be secured through effective use of the UNESCO World Heritage Site label. The imminent extension of the Aldabra marine protected area is another measure that will increase the resilience of Aldabra to the effects of climate change and other potential pressures such as illegal fishing. Finally she highlighted the importance of engagement and connection to relevant national initiatives, in the case of Aldabra this is the Marine Spatial Planning Initiative coordinated by the Seychelles Government and The Nature Conservancy.

To find out more, a fantastic video of highlights of the conference was produced and can be found here - <https://www.youtube.com/watch?v=BmID3ppSQbE>

SIF staff member completes MSc at University of Kent



Wilna at the School of Anthropology and Conservation at the University of Kent © W Accouche

In September, SIF welcomed back our science programme officer, Wilna Accouche, after she completed her MSc in Conservation Project Management at the University of Kent, UK. Wilna studied at the Durrell Institute of Conservation and Ecology (DICE) at the University of Kent, which is well-known for its high quality of conservation programmes. The courses offered by DICE are particularly suitable for conservation professionals like Wilna, as they are multi-disciplinary, offering perspectives into the scientific and social aspects of conservation.

For her MSc dissertation, Wilna researched the application of business excellence models for the conservation sector, notably for protected areas. One particular business model, adapted for conservation and known as the 'Conservation Excellence Model' was used to assess the Aldabra Atoll protected area. Wilna said of her research 'One of the reasons I chose this research subject was my interest in protected area management, as well as wanting to contribute further to research in Seychelles'. The research also looked into existing assessment tools for protected areas and how the business excellence model can provide an alternative, suitable and comprehensive assessment tool for protected area assessments.

Other than having to acclimatise to the chillier UK weather, Wilna very much enjoyed studying in the UK. The opportunity to work with students from all over the world and lecturers who are undertaking exciting research in their respective fields was a unique opportunity that Wilna was very grateful for. Wilna would like to thank all the SIF staff who participated in her research, the SIF management who provided support, her lecturers at DICE and her dissertation supervisor, Dr. Simon Black. Wilna is also grateful to the British High Commission who awarded her the national Chevening Scholarship which provided financial support to undertake the Masters degree.

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Visitors enjoying their free guided tour during World Tourism Week © SIF

As a key pillar of the Seychelles' economy, and the means of keeping both of Seychelles UNESCO World Heritage sites operating and protected, tourism is an essential activity and fittingly celebrated by World Tourism week.

MSc submitted on Giant Bronze Gecko



A Giant Bronze Gecko with a radio tracker 'backpack' © C Tagg

After many months of field work and data crunching, University of Bournemouth MSc student Chris Tagg has now completed his dissertation on the Giant Bronze Gecko. His research has given us a greater insight into this elusive yet charismatic species.

Chris collected a huge amount of data in the few months of fieldwork. He caught a total of 666 geckos in an area of 3 hectares of the Vallée de Mai, which included many re-captured individuals, and he measured and pit-tagged 214 individual geckos. New data collected from individuals which were also caught in earlier years will provide information on survival and growth, and the entire dataset forms important baseline information for the species. The mark-recapture part of the study produced a population estimate of 1594-2364 geckos in the Vallée de Mai but this estimate has yet to be extrapolated to other areas of palm forest as this would require further research in these areas. The radio-tracking data showed that home range size of the geckos varied between individuals but male and female home range size was similar, unlike in other gecko species where males normally have much larger home ranges.



Chris in his element, working with the geckos in the Vallée de Mai © SIF

This work will now be written up as a scientific publication which will include more data analysis to make the most of the strong dataset. Chris would like to thank all of the SIF and Vallée de Mai teams, not only for their assistance and support but also their team spirit and enthusiasm for this project.

Clean Up the World Day



SIF MSc student presents at Swiss conference



Annabelle presenting her poster at the conference © R Baxter

University of Zurich MSc student and SIF staff member Annabelle Constance, recently attended the University Research Priority Programme (URPP) Global Change and Biodiversity Conference in Monte Verità, Switzerland.

Annabelle attended the conference to present a poster on her MSc research (see SIF newsletter issue #40 – March 2016) with SIF and the Zurich-Aldabra Research Platform. The conference programme was intensive, with many stimulating presentations and interactive open discussion sessions with experts in their respective fields. Annabelle was the only Masters student presenting at the conference and one of the youngest participants. The conference was an excellent opportunity for her to meet with others working in related research fields and receive feedback on her poster. Annabelle's poster title was *'Mangroves on Aldabra Atoll – Stand diversity and structure of a key conservation habitat'* and explored the spatio-temporal extent of mangrove habitat on Aldabra. Her research poster was well received and Annabelle was able to share her results so far with other participants at the conference who showed a great interest in her work.

Humpback whale sightings decline



Humpback Whale breaching at Aldabra © SIF

The Humpback Whale (*Megaptera novaeangliae*) is one of the most commonly observed whale species seen in shallower, warmer waters during the southern hemisphere winter and is the only whale species for which there is a clear seasonal pattern in sightings around Aldabra. Humpback Whales undertake an annual migration between high latitude summer feeding areas and low latitude winter breeding areas. Sightings of the whales at Aldabra are usually made from June/July - Sept/Oct, which is consistent with the general migration pattern of the species.

Anticipation for the arrival of the whales was high this year, with all staff at the research station hoping they would be the first to spot a whale. The first sighting from the research station was made later than usual on 13th August and a further eight sightings were made throughout August. This represents fewer sightings and a shorter season than in previous years. The team is still on the lookout for any latecomers but it seems that the season is already over.

There are many factors that may influence Humpback Whale migration and the low number of whales seen this year. Studies elsewhere have shown that decreasing food availability in the Antarctic feeding grounds due to global climate change and warmer ocean temperatures is directly linked to birth rates. A recent long-term study showed that global climatic processes are also affecting Southern Right Whales, with a strong relationship between breeding success and the occurrence of an El Niño event. It is therefore likely that the decline in Humpback Whale sightings in the South-western Indian Ocean this year is a consequence of the 2014-16 El Niño event, which further exacerbated the warmer ocean temperatures. It is thought that global climate change will not only impact future breeding success of whales but also the seasonality of their migrations.

Although the whales are affected by these changes globally, we can all play a small part in reducing these effects by lowering our carbon footprint in our day-to-day lives. Collectively this can make



Don't forget to like our Facebook page! The page has regular news and updates on research and events at both World Heritage Sites. We would invite all friends, supporters, partners, colleagues, and anyone else who has an interest in staying up to date with the management and protection of the UNESCO World Heritage Sites in the Seychelles, or in Seychelles' biodiversity and conservation in general to become a fan of our page. For those who have a Facebook account already please use this link https://www.facebook.com/pages/Seychelles-Islands-Foundation-SIF/1414466072110654?hc_location=stream and 'Like' our page. For those that are not on Facebook then perhaps you can receive updates through a friend or family members account, or maybe now is the time to join Facebook for yourself! We look forward to welcoming you onto this page!



The dedicated volunteers collecting rubbish from the roadside © SIF

SIF joined once again with local partners on Praslin to take part in clean up efforts as part of the global Clean Up the World campaign. This event is held to help mobilize and empower people in the community to clean up the natural environment that we all depend on. A group of 22 members from the Praslin Scout Association of Seychelles joined together with SIF Vallée de Mai staff for a clean up activity at the Vallée de Mai on Saturday 17th September.

It was important for all the participants to understand the importance of the event and the impact that a polluted and contaminated environment would have on the Vallée de Mai nature reserve, therefore a short briefing was conducted by the site manager and education and outreach programme officer. The participants were then divided into two groups and collected rubbish from both sides of the road from the Vallée de Mai to Nouvelle d'Ecouverte near Grande Anse. A variety of waste items were collected, which had sadly been discarded by irresponsible passersby. It was unfortunate to see that some of the waste was household garbage which had intentionally been dumped there.



Some of the rubbish found discarded by the roadside © SIF

Despite difficult and challenging terrain the determined young "eco-warriors" managed to collect a total of 25 large sacks of waste. This waste was mainly comprised of plastic bottles, glass bottles, metal drink cans, and plastics. There were also unusual items such as car batteries and plastic chairs collected. SIF would like to extend our sincere thanks to our dedicated partners, the Praslin Scout Association of Seychelles and the Landscape and Waste Management Agency, for their support in this event.

DESMAN funding used for black parrot research equipment



The funding will assist the research programme of the Seychelles Black Parrot © C Tagg

Vallée de Mai Ranger Terence Payet successfully completed the Durrell Endangered Species Management (DESMAN) course in May at the Durrell Institute in the UK (see SIF newsletter issue #42 – May 2016). As part of the course he wrote and submitted a funding proposal for much-needed field equipment for SIF to continue monitoring the Seychelles Black Parrot during its breeding season. Terence and SIF were delighted when he was awarded

carbon footprint in our day-to-day lives. Collectively this can make a difference in global atmospheric and climatic processes, therefore reducing their impact on whale populations.

season. Terance and SIF were delighted when he was awarded this funding, which has provided new mist-netting, ringing and measuring equipment for the parrots.

The Durrell Institute has already provided the equipment, which has arrived in time for the start of the next black parrot breeding season in November. SIF and Terance would like to extend their thanks to Durrell for this generous support, which will certainly help the team to continue the crucial research of this beautiful and vulnerable endemic species.

Articles contributed by: *Rowana Walton, Nancy Bunbury, Maria Brioché, April Burt, Chris Tagg, Wilna Accouche, Terance Payet, Annabelle Constance, Fernando Cagua, Rosie Gordon.*