

# SANCOR NEWSLETTER

## South African Network for Coastal and Oceanic Research

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## Understanding sevengill sharks

By Alison Kock<sup>1</sup>,  
Helen Lockhart<sup>2</sup> & Steve  
Benjamin<sup>3</sup>

<sup>1</sup>Shark Spotters,

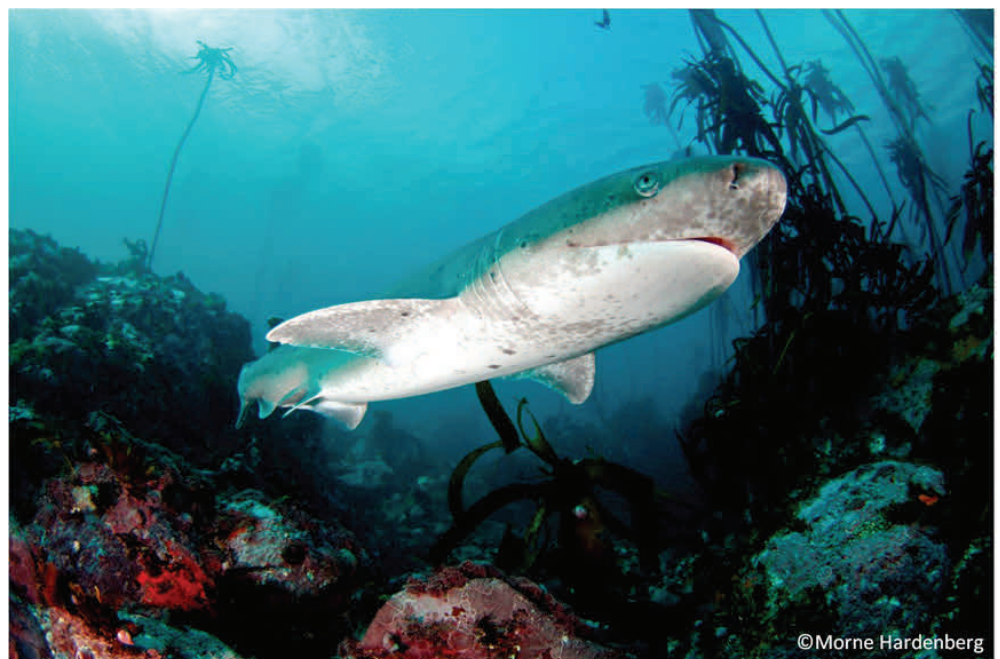
<sup>2</sup>Two Oceans Aquarium,

<sup>3</sup>Animal Ocean

In 2013 the Two Oceans Aquarium agreed to assist with an exciting long-term research project on broadnose sevengill sharks *Notorynchus cepedianus* (also known as cowsharks). The project involves gaining a better understanding of their feeding, spatial

(movement) and reproductive ecology and ultimately aims to define their role as apex predators in South Africa. The project uses a combination of cutting edge, minimally-invasive techniques, including satellite and acoustic tracking to study movements, analysis of blood and muscle to study diet and analysis of the hormone concentrations in blood to investigate reproductive biology.

With thanks to Woolworths the Two Oceans Aquarium recently handed over R150,000 to Dr Alison Kock, Research Manager for the [Shark](#)



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Sevengill sharks have seven gill slits instead of five which is the norm in other shark species. *Photo by Morne Hardenberg.*



[Spotters](#), who is leading the project. The money was generated from the sales of the ‘shark/seventy-four’ [Ocean Promise](#) reusable shopping produced by Woolworths in collaboration with the Aquarium. In addition to this funding, the Aquarium has also provided logistical expertise and funding for a satellite tag.

**The broadnose sevengill shark**

The broadnose sevengill shark is a large (up to 3m) coastal-associated apex predator which is found in temperate waters around the world. It lives in kelp forests around the Cape and increasingly attracts the interest of scuba divers particularly off Millers Point in False Bay. According to [Steve Benjamin](#) of Animal Ocean, “It is called a number of names [including] cowshark, sevengill shark or the full length broadnose sevengill cowshark, which has one too many descriptive nouns for my liking. We mostly just refer to them as cows! Not a very frightening name to attract shark divers”. The common name ‘sevengill’ alludes to the fact that these sharks have seven gill slits instead of five which is the norm in other shark species.

**Apex predators and their conservation status**

This species’ position in the food chain rivals that of other species considered important apex predators such as tiger sharks and white sharks. Yet, in contrast to the latter two shark species, considerably less information is available on sevengill sharks. Sevengill sharks are a low value fishery species across most of their global distribution. However, there are limited management policies or conservation considerations for this species in any country, and commercial exploitation in South Africa is currently unrestricted.



Ongoing unregulated exploitation is of concern, as previous targeting of sevengills in California and Namibia suggests that they are vulnerable to over fishing. Their low conservation priority may be



Part of the research funding for this project was generated from sales of the reusable ‘shark/seventy-four’ Ocean Promise Bag.

attributed to the lack of available data (classified as data deficient on the IUCN Red List). One of the aims of this project will be to collect enough data to better inform the management of this species.

**Sevengills in False Bay**

False Bay is unique in that it is the only place in world where large numbers of sevengills (up to 70 on a single dive) can be consistently seen. In all other instances, the visibility is too poor or sightings are few and far between. “We suspect that pregnant females reside here. There is little known information on pregnant females elsewhere in world so this presents a great opportunity

to collect more data which will be done by using non-destructive methods, e.g. analysing hormones in the blood samples that are collected” said Dr Alison Kock, Research Manager for the [Shark Spotters](#) who is leading the research project.

**Sevengill shark research project**

The research is being co-ordinated by Dr Alison Kock, Research Manager at Shark Spotters and Dr Adam Barnett from James Cook University (Australia), with assistance from colleagues and students from the University of Cape Town, the Department of Agriculture, Forestry and Fisheries, the South African Shark Conservancy, Bayworld Centre for Research, SAIAB’s Acoustic Tracking Array



Platform, the Ocean Tracking Network, Oceanographic Research Institute, and the Two Oceans Aquarium. Funding is primarily from the Two Oceans Aquarium, with additional financial or equipment support from the University of Cape Town, University of Tasmania, Save Our Seas Foundation and Ocearch.

Sevengill sharks are being tagged with acoustic and pop-up archival transmission (PAT) satellite tags. PAT tags are programmed to collect and archive data such as depth, temperature, and light levels before the tag releases from the animal at a pre-programmed time. Once released, the tag floats to the surface where the GPS position of the release location and archived data are sent to satellites passing over head. The acoustic tags, on the other hand, transmit a signal underwater which can be picked up by one of twenty four acoustic receivers which have been deployed in Cape Town waters.

The sharks are also measured, sexed, and biological samples collected. Blood and muscle samples allow for the analysis of genetics, stable isotopes to determine diet without the need for lethal sampling, and for reproductive hormone analysis, which allows the team to assess maturity status and reproductive status (the stage of the reproductive cycle they are in) without the need for lethal sampling.

The team take the utmost care of the sharks to ensure their welfare, and all methods have been approved by the University of Cape Town's ethics committee. All surgical procedures are performed by the Two Oceans Aquarium's resident veterinarian, Dr Georgina Cole.

#### Project achievements to date

Since March 2013 the team have acoustically



A shark is carefully released from a tag cradle.

tagged 25 sevengills (so far all female as the males are rarely encountered) and attached PAT tags to three more.

All three PAT tags have released from the sharks: two released prematurely and the third one released on schedule. The three sharks made totally different movements:

- Shark 1 moved into deeper waters, about 200 km off the south coast of

South Africa on the Agulhas Bank. This shark spent most of its time at depths between 10 and 60m.

- Shark 2 remained within False Bay and recorded most of its time at depths of between 40 and 60m, which indicates that it spent most of its time outside of the aggregation area which has a maximum depth of 12m.



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The silhouette of a sevengill shark. *Photo by Morne Hardenberg.*





- Shark 3 moved approximately 200 km up the west coast near Silverstroomstrand. This shark spent most of its time between 10 and 40m depth, with a maximum depth of 130m.

One of the Aquarium's collections team, Dean Hill, found the actual PAT tag on the beach near Silverstroomstrand which was an absolute luck as we are able to retrieve more information from the tag over and above that which is sent via satellite.

With the expected 10-year battery life of the acoustic tags, the research team is hoping to give the project a long-term focus and extend this out of False Bay to other areas of South Africa. "The funding from Woolworths and the Two Oceans Aquarium will allow us to purchase more acoustic transmitters and upgrade the acoustic receivers, which are necessary for the long-term monitoring objectives," said Dr Kock. "We also now have enough funds to have two dedicated MSc students working on the project which will allow us to achieve more consistent sampling".

"I am delighted that we could help financially and logistically in such a way with such an important project, especially from a local perspective. I look forward to receiving the MSc proposals and becoming more involved" said Michael Farquhar, the Aquarium's Curator.

The Aquarium hopes to display cowsharks in its forthcoming [dedicated shark exhibit](#) which is scheduled to open towards the end of 2015. ✂

## Tag and release fishing project in Goukamma MPA

*By Alex Munro*  
CapeNature,  
Goukamma Nature Reserve,  
Knysna

It is evident that most fisheries nation-wide (including surf zone fish species) are under immense pressure due to over exploitation and other pressures. Recent research has revealed that regulations have failed to adequately protect the fishery resource, either because of poor enforcement or that the regulations themselves were not limiting enough. It is therefore vitally important for the conservation of these species and their habitats that Marine Protected Areas (MPA's) are established. Once established it is critical to continually monitor the relevant components of the protected area (with the use of scientific monitoring programmes) and determine if the MPA is functioning effectively so that the management strategies in place can be adjusted accordingly.

Goukamma MPA was originally proclaimed in July 1990 in the interest of protecting the offshore reef fish species, surf zone fish species and bait organisms. Harvesting of any organisms out of the MPA was not allowed at this time. Then in October 1990, following public pressure the MPA was opened to allow shore-based linefishing, but remains closed to boat-based angling and harvesting of bait organisms. Currently Goukamma is proposing to rezone a portion of the MPA, again closing it to shore-based linefishing, as well as extending the offshore MPA boundary further south to include more offshore reef habitat. This will create a safe-haven and breeding ground for many of the surf-zone fish species, which should render adja-

cent areas more productive in terms of catches.

In October 2013 Goukamma introduced a 'tag and release' angling project with the aim to monitor surf-zone fish species diversity, abundance, population age structure and movement in the MPA and an exploited area adjacent to the MPA. The concept is that fish are some of the top predators in the surf-zone and therefore can be used as ecosystem health indicator species. Furthermore, the project will continue if the proposed rezonation of the MPA takes place, creating a fantastic opportunity to monitor fish recovery in the MPA, as well as the increase in catches to adjacent areas, once the MPA populations have recovered. As volunteer anglers used for the project are from the local angling community another aim of the project is to try and get the local angling community 'on-board' with the catch and release movement. Not only will this help relieve pressure off the fishery, but will also provide more tag data for Oceanographic Research Institute's (ORI) national tagging database, which is used for critically important fish movement and growth-over-time studies.

The tag and release angling project consists of a two day outing, held over eight weekends per year. Eight anglers volunteer from the local community and the dates for the project are predetermined to not clash with local angling competitions. This sometimes leads to it falling on foul weather conditions, but the project goes ahead regardless. Accommodation, food, tackle and lifts to the angling sites are provided for the anglers. The requirement then is that anglers must



fish both days from sunrise to sunset, regardless of the weather and sea conditions. This can be quite demanding, as when a cold front is marching up the coast! Anglers record the length and species of fish (this includes sharks) caught as well as tagging all priority species. All fish caught are released.

Until now Goukamma has successfully hosted eight of these outings with more than 430 fish caught so far. Only one of the outings has had really foul weather, where anglers had to contend with hail, strong winds and rain. As the project is long-term it is still too early to determine any population statistics. The hope is that in future the data will provide a strong case for the benefits of MPA's, as well as providing critical data towards the conservation and sustainable utilisation of inshore fish species.

If there are any anglers that are interested in committing to the project, you can send us an email to [goukamma-rangers@capenature.co.za](mailto:goukamma-rangers@capenature.co.za), titled: "Goukamma tag and release". Your name and contact details will then be added to the database and you will be contacted when there is a position available. ✂



Goukamma's 'tag and release' angling project aims to monitor ecosystem health indicator species.

## Marketing mangrove services

By Robert Runya &  
Anne Wanjiru

Mikoko Pamoja Community  
Organisation, Kenya

On 15th May, 2014 a group of 70 students mostly from Gazi and Makongeni primary school joined Mikoko Pamoja community organization in their annual mangrove planting. This is an activity spearheaded by IOI-East Africa among other organizations in a bid to restore degraded mangrove areas through an incentive based mechanism. Replanting mangroves in Gazi avoids further degradation and generates approximately 3000 tonnes CO<sub>2</sub> per annum that is then traded into voluntary carbon market.

The planting ran in May and June, 2014 during low level spring tide. Together with the primary school children, other participants from local Gazi community, Kenya Marine and Fisheries Research Institute, and from Rafiki Kenia foundation, a non-governmental organization, government agencies and civil society were involved.

Mikoko Pamoja is about living in harmony with mangroves. It is a community led project which derives income from sale of mangrove carbon through conservation, protection and restoration of critical mangrove forests. Mangroves are known to sequester six times more carbon than terrestrial forests and are of great ecosystem value.

Mikoko Pamoja activities not only benefit the local community but are also important to the wider marine environment. It is the first community based project of its kind in the world to engage in sale of mangrove carbon. The project is accredited by Plan Vivo standards and system to sell 3000tCO<sub>2</sub> per year into the voluntary Carbon Market;



Mikoko Pamoja treasurer plants a mangrove tree.

generating approximately US\$15,000 per year to the community. Gazi community has a commitment to replant 4000 mangrove trees per year for the next 20 years. This is in addition to protecting the natural mangrove stands from further degradation.

This year more than 2000 seedlings of mangroves, *Sonneratia alba*, were planted in an eroding shoreline of Gazi Bay. These mangroves will not only offer coastal protection but also provide other ecosystem benefits such as; breeding sites for fish, carbon sequestration amongst others. Mikoko Pamoja is an example of a triple win project where community, biodiversity and environment benefit. So far the project has donated school materials to Makongeni and Gazi primary schools. The organization's chairman Mr. Mwarandani commended the community for participating in the planting activity especially school going children. He added that engaging school pupils is important in nurturing future leaders with a conscience to conserve the environment. The Mikoko Pamoja committee gave its assurance of its commitment towards transforming communities surrounding Gazi Bay. One could easily see the pupils' energy and enthusiasm in supporting Mikoko Pamoja activities.

Mangrove planting is a key activity in attaining project targets and also important for next payment of carbon money. ✂



## Scientists return to Cape town with stunning images of the seabed

By Claire Attwood

Fishmedia

A unique partnership between the fishing industry, a number of marine research institutions and the Department of Agriculture, Forestry and Fisheries (DAFF), is helping scientists to gain a better understanding of the plants and animals that live on or close to the seabed off the west coast of South Africa.

A team of scientists and has just returned to Cape Town with a treasure trove of images showing how well-known deep-sea fishes, like kingklip, hake and jacobever live in their natural environment, and a host of pictures of little known seabed plants and animals. The scientists are participating in a five-year project to better understand the impacts that trawling may have on the seabed. They are studying an area known as "Karbonkel" which is located off Port Nolloth.

Usually, deep-sea trawlers fish for hake in the Karbonkel area, but these trawl grounds have been closed to allow scientists to methodically survey the seabed in the area. They are using a submersible camera and a benthic grab (a kind of scoop that collects gravels and mud from the seafloor) to determine whether the closure of the trawl grounds is having an impact on the plants and animals that live there.

"We are surveying life on the seafloor to see how the trawl lanes that have been closed to trawling are responding to the lack of disturbance," explained Professor Colin Attwood, chief scientist on the voyage.

"We would expect macrofauna to establish themselves in these lanes, but we have no idea how long that will take."

Macrofauna are small marine mammals,

including snails, worms, clams and other thumbnail-sized creatures that live and feed in the sediments on the sea floor. Macrofauna were collected and analysed in exactly the same trawl lanes last year, but the difference is that the lanes had been recently trawled. The scientists are eager to see whether there is a difference in the number and type of species photographed and collected now that the lanes have been closed to trawling.

Their work represents a unique five-year collaboration between the South African Deep-Sea Trawling Industry Association (SADSTIA), DAFF, the University of Cape Town and the South African Environmental Observation Network (SAEON). The goal of the collaboration is to obtain a scientific understanding of the environmental impact of hake trawling in South Africa.

Dr Johann Augustyn, secretary of SADSTIA, explained the rationale behind the experiment: "As an industry, we are concerned about our footprint," he said, referring to the impact of fishing activities.

"In South Africa, hake trawling occurs almost entirely on soft, muddy, sandy or gravelly sediments and even though the size and weight of trawl gear is strictly regulated, we want to understand the impacts that trawling has on the ecosystem – and the time it takes for the seabed to recover after it has been trawled."

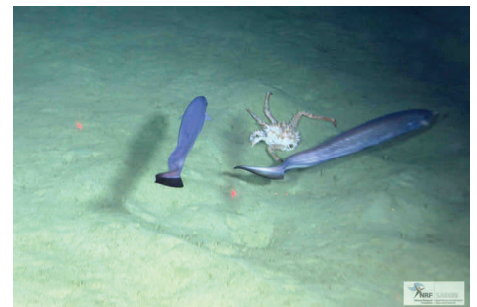
SADSTIA's members have agreed to close an important trawling ground to facilitate the study and the fishing industry arranged for two senior electronics technicians to assist the scientific team. Driaan Pretorius, engineering manager with Viking Fishing, and Jean van der Merwe, fleet electronics



A kingklip is pictured in its natural environment, at a depth of about 300m. Around it are raspberry starfish, *Crossaster penicillatus*.



A rat-tail is captured in the light of the submersible camera.



Two ribbon eels and a deep-water spider crab.



This screen grab from a video captured at between 300 and 400m shows a monkfish gliding along the seabed.





manager with Sea Harvest, both worked on the Ellen Khuzwayo during the February research cruise.

"We're quite excited about the experiment," said Russell Hall, Sea Harvest's trawling division manager. "Jean has been involved right from the start of the experiment when we started looking at areas where we could test the trawl recovery process, so he has all the background, and we think his expertise in electronics will be very helpful to the project."

Driaan Pretorius assisted the scientific team in 2014 and contributed his time and expertise again this year. Also on the scientific team was Dr Kerry Sink, the head of the South African National Biodiversity Institute's (SANBI) Marine Programme, and a long-time advocate for a system of

offshore marine protected areas (MPAs). Dr Sink is excited by the fact that the team gathered photographs from Child's Bank, a seamount located adjacent to the Karbonkel trawl grounds. "Child's Bank has been identified as a focus area for offshore protection, but on this survey we saw it for the very first time," she said. The Ski-Monkey submersible camera was modified to allow it to collect images from Child's Bank without damaging the hard corals and benthic species that occur there.

Offshore MPAs are entrenched in the Phakisa programme – government's initiative to unlock the economic potential of South Africa's oceans – and SADSTIA has worked with scientists and conservationists since 2006 to identify the most suitable areas for an offshore MPAs. ✂



A multidisciplinary team of scientists and technicians is involved in the seabed recovery experiment. Pictured here are (back row): Dr Johann Augustyn, secretary of SADSTIA; Professor Colin Attwood of the University of Cape Town; Dr Kerry Sink, head of SANBI's Marine Programme; Dr Charles von der Meden, a postdoctoral researcher with the South African Environmental Observation Network; Karen Tunley, a PhD student at the University of Cape Town; Hermann Engel an electronics technician with the Department of Agriculture, Forestry and Fisheries; and Driaan Pretorius, engineering manager of Viking Fishing. In front, holding the benthic grab that will collect samples from the seabed during the voyage are Jean van der Merwe, fleet electronics manager at Sea Harvest, and Dr Lara Atkinson, an offshore marine scientist with SAEON.

## Art collaborations for research and conservation



Renowned artist, Vincent Reid ([www.reidstudios.co.za](http://www.reidstudios.co.za)) has teamed up with the Marion Island Marine Mammal Programme in aid of research, conservation and public awareness!! He has generously agreed to do a series of art over the next few months; a large portion of proceeds from the sale of these original artworks and their subsequent prints will go towards our research and conservation efforts.

Visit

<http://www.marionseals.com/art>  
for more details.

The Marion Island Marine Mammal Programme is a research programme of the Mammal Research Institute at the University of Pretoria.

*Bidding NOW OPEN*

*(closes: midnight on 15 March 2015)*



# Discovering the deep seas

*By Kirsty McQuaid*

South African  
National Biodiversity Institute

Despite forming more than 60% of Earth's solid surface, the deep sea is one of the most understudied habitats on the planet. This unique and mysterious environment presents numerous challenges to life and is consequently home to many interesting and diverse creatures. Discoveries in deep-sea research began in the 1800's, and since this time exploration has slowly gained momentum, with advances in technology pushing the field forward. With the emerging pressures of mineral mining and petroleum production moving into deeper and deeper waters, the biodiversity of our relatively understudied deep oceans is at increasingly greater risk of impact from human activities. Research in this field is more important now than ever before!

Unfortunately, deep-sea research in South Africa lags far behind more developed countries such as Japan, the United Kingdom and the United States of America. This is why, when I was given the opportunity to attend a summer course in "Deep Sea Biodiversity, Connectivity and Ecosystem Function" at Friday Harbor Laboratories, I jumped at the chance! Friday Harbor Laboratories (FHL) is a marine field station of the University of Washington and is based on the island of Friday Harbor, a 2 hour ferry ride from Seattle, Washington, USA. My course was one of four being run concurrently, and the campus was buzzing with students and researchers excited for a new summer term. Coordinating the Deep Sea class were Professor Craig Smith, expert



The view of Friday Harbor Laboratories from the water.

in deep seafloor community ecology and professor of oceanography at the University of Hawaii, and Professor Ken Halanych, marine biology co-ordinator at the University of Auburn and an expert in systematics and phylogeography of marine invertebrates.

The course ran for five weeks and was packed full of lectures, field trips and laboratory work. We hit the ground running with introductory lectures on key environmental and ecological characteristics of seafloor ecosystems in the deep-sea. These lectures focused on factors that influence community structure and function, such as sediment characteristics, oxygen availability and environmental stressors. We had several lectures on patterns of biodiversity and ecosystem function, covering unique and exciting deep-sea habitats such as seeps, hydrothermal vents, submarine canyons, large organic falls and

seamounts. These were coupled with lectures on ecological connectivity, evolutionary patterns and patterns in biogeography. While the course was focussed mainly on deep-sea benthic habitats, we also explored some of the deep-sea pelagic environments.

One of the best parts of this course was the practical experience. Lectures were complemented by exciting field trips, lively discussion sessions and late nights in the laboratory. This provided a great chance for us to bond with our class mates and supervisors. Our fieldtrips included a demonstration of ship-based benthic sampling methods, collection and identification of benthic macrofauna, and a trip back to the mainland for the christening of Scripps Institution of Oceanography's newest research vessel *RV Sally Ride*. We were also introduced to diversity analyses





using Primer, data acquisition from Ocean Networks Canada's world-leading cabled ocean observatory, and lab techniques for molecular genetics. Discussion sessions were held once or twice a week and were aimed at fostering critical thinking about current hypotheses, experimental design and issues related to deep-sea ecosystems. These were informal sessions which sparked interesting and passionate debates. In addition to this, guest lecturers were invited to present their work in various fields of deep-sea research. This gave us an incredible opportunity not only to learn from some of the best in their fields, but also to network and connect with these international experts in an informal setting.

A large component of the course was project based. With the help of our supervisors we developed individual mini projects that explored an aspect of deep-sea biodiversity, ecology or genetics. Most of our projects made use of samples collected prior to the course, as there was limited capacity for deep-sea sampling within the 5 week time frame. As part of the *Bone and Wood Landers* project run by the University of Hawaii and Auburn University, wood and bone landers were deployed at various depths off the coast of Washington and



A block of wood bored by a shallow-water, wood-boring clam species.

Oregon for 15 months. These were retrieved prior to the start of our course and we were therefore able to use some of the material collected. I looked at recruitment in a deep-sea wood-boring clam species, *Xylophaga washingtona*, using specimen collected from a wood block placed at 1500 m. This was a fairly ambitious task,

demanding long, late nights in the lab, but it was an awesome opportunity to work on real deep-sea specimen and learn more about genetic techniques. The photograph above shows the devastation caused by similar shallow-water wood-boring clams, and illustrates why they were historically known as ship worms, destroying entire wooden ships.

Despite all of the hard work, we also made time to have some fun! When we weren't exploring the beautiful forest surrounding the campus we were jumping into the freezing ocean off the dock, taking a trip in the row boat to town or gathered on the deck for TGIFHL (*Thank Goodness It's Friday Harbor Laboratories*) to relax after another tough week. Our class trips included a drive to a popular orca whale viewing point, in the hopes of catching a glimpse of the resident or migratory populations, and toasting marshmallows over a bonfire on the beach.

This trip was the most incredible experience. It deepened my passion for studying the deep-sea enormously and created fantastic opportunities to meet with experienced,



Deep Sea class trip to Long Beach, Friday Harbor.

inspiring people. All of this was made possible through extremely generous funding from the National Science Foundation (USA) via my supervisors Ken and Craig, the FHL 'Adopt-a-Student' programme and my own institute, the South African National Biodiversity Institute, for which I am profoundly grateful. During introductory lectures to FHL one professor finished by saying "If this is your first time at FHL, be warned: you will spend the rest of your career trying to come back". I can now see why this is true. ☞

**W**  
UNIVERSITY of  
WASHINGTON



## Integrating human dimensions into MPA planning and management

By Merle Sowman, Serge  
Raemaekers and Jackie  
Sunde

Environmental Evaluation Unit,  
University of Cape Town

Marine protected areas (MPAs) are increasingly being used as a tool for the achievement of conservation, biodiversity and fisheries management objectives around the world. This is in response to growing concerns about the state of coastal and marine resources and the on-going threats posed by environmental and climate change, industrial and property development, mining activities, recreational pressures, overexploitation of resources, pollution and poverty. The Convention on Biological Diversity (CBD) Strategic Plan, Aichi Target 11 aims for a global system of protection and sustainable use by 2020 in which

*“at least 17 per cent of terrestrial and inland water areas, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.” (CBD/ COP/10 Decision X 2/ 2010).*

Member states have responded proactively and have begun expanding their marine protected area networks. However, many of the MPAs that have been established to date have been established, planned and managed with little consideration of the *human* dimensions and impacts. This

includes social, cultural, economic, political and governance issues, such as human values, aspirations, lifestyles, cultural heritage, livelihoods, local economic activities and governance systems. In particular, very little attention has been given to how MPA planning and management affect local resource-dependent communities and other stakeholders.

Various conventions, protocols and agreements, including the Convention on Biodiversity (1993) and its associated Programme of Work on Protected Areas, the FAO Code of Conduct for Responsible Fisheries (1995) and the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem (2001), all recognise the importance of the conservation of coastal and marine resources and areas, but they also highlight the need to take account of the human dimensions in planning and management, with a particular focus on understanding the needs of those communities living in or adjacent to such areas. These human dimensions need to be considered in relation to ecological dimensions. Failure to address these concerns may undermine MPA objectives and benefits.

However, a significant body of peer-reviewed literature indicates that if planned and managed in a participatory and integrated manner, taking the values, rights, needs and concerns of local communities and other stakeholders into account, MPAs can provide a range of benefits for local communities, local economies, conservation, fisheries and the natural environment.

### Exploring the human dimensions of MPAs in South Africa

South Africa has committed itself to many conventions, protocols and agreements relevant to MPAs and has promulgated policies and legislation to give effect to these instruments. The Constitution of South Africa (1996) contains environmental provisions in its Bill of Rights that require the balancing of ecological sustainability with socio-economic rights and needs. Several environmental policies and laws have a bearing on how MPAs are identified, planned, managed, monitored and governed: they include the National Environmental Management Act (1998), which sets out the framework for how the environment should be managed, the National Environmental Management: Protected Areas Act (2003) which, in terms of the amendments to this Act in May 2014 now embodies the legal mandate for establishing and managing MPAs in South Africa, as well as the Marine Living Resources Act (1998), Biodiversity Act (2004) and Integrated Coastal Management Act (2009). These laws, while concerned with promoting environmental conservation and management, all require that various social sustainability principles, including equitable access to resources, sharing benefits from protected areas and the active participation of indigenous peoples, local communities and civil society more broadly, be upheld in planning, management and decision-making processes. A key requirement in all cases is the consideration of human rights and needs, especially in light of the need for redress, when pursuing environmental, conservation and fisheries management goals.



In response to these legislative imperatives and the growing recognition in the literature of the need to understand and integrate the human dimensions of MPAs, a group of researchers from the Environmental Evaluation Unit, now incorporated into the Department of Environmental and Geographical Science, at the University of Cape Town embarked on a four-year research project in 2010 entitled ‘The Human Dimensions of Marine Protected Areas in South Africa, with a focus on small-scale fishing communities’. This research project was funded jointly by the WWF Nedbank Green Trust and the National Research Foundation. Six MPAs including Table Mountain National Park, Dwesa-Cwebe, the Kogelberg, Hluleka and Langebaan were selected as case study sites. In addition, studies in the Struisbaai-Agulhas area were undertaken as preliminary planning to explore enhanced protection of this coastal area had been initiated. A team comprising three senior researchers and five post-graduate students worked together over this period, identifying and examining key human dimensions relevant in these case study sites and extending understanding of how these human dimensions interact with the ecological dimensions in these areas, shaping the outcomes pertaining to the MPAs.

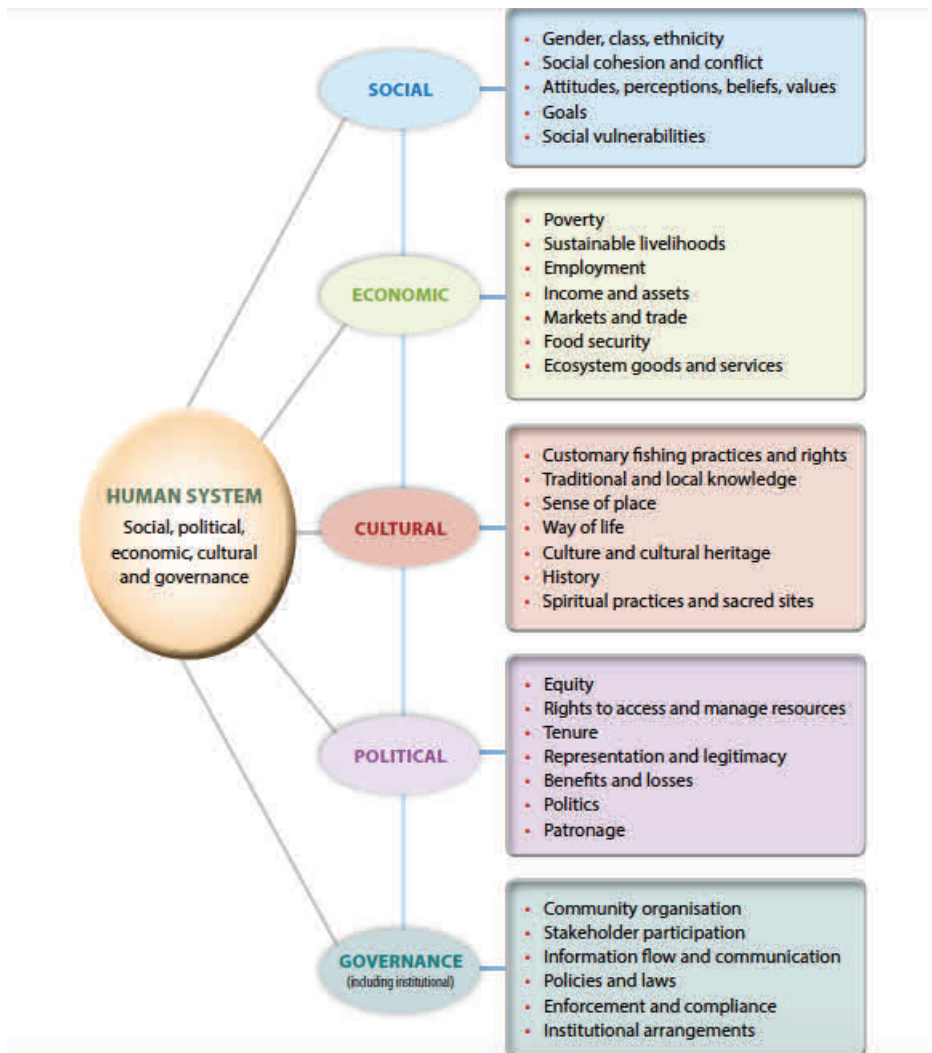
The research highlights the fact that many of the coastal and small-scale fishing communities living in or adjacent to MPAs are poor and have been marginalised through past discriminatory political processes in South Africa. A range of social, economic, political and cultural dimensions interact in these contexts to shape peoples’ interactions with the marine and coastal

environment and the governance of MPAs. Consequently, the research team developed a conceptual framework to assist with identifying and investigating the human dimensions of MPAs.

Increased awareness of the complexity of human-ecological interactions and the multi-faceted nature of poverty, marginalisation and vulnerability in such fishing communities therefore requires a multi-dimensional, multidisciplinary and participatory approach in order to understand and respond to the human dimensions in these contexts. Further, the research findings highlighted that the **HUMAN dimensions are relevant throughout the planning, management, monitoring and evaluation process – whether one is embarking on a planning**

**process, carrying out an analysis to understand the current threats and challenges to an MPA, conducting ongoing monitoring, undertaking an annual review or evaluation, or preparing a management or operational plan for the area.**

The implications of these findings for MPA management points to the fact that awareness and understanding of the human dimensions, including people’s rights and needs and the potential costs and benefits of MPAs, needs to commence prior to planning and decision-making in MPAs. Only if local communities feel that their rights and needs are understood and addressed will they be able to support conservation measures such as MPAs and work collaboratively with the management authorities to minimise losses





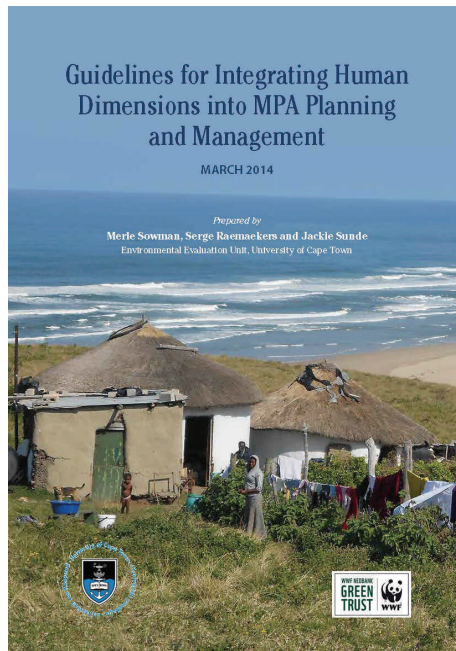


and enhance potential benefits. This requires the relevant planning and conservation authorities to actively demonstrate their awareness of and understanding of the rights, key values and needs of local communities. Addressing these human rights and socio-economic needs as well as conservation objectives is extremely challenging in this context, where pressure on resources is increasing, environmental and climate change is occurring and disparity between rich and poor is widening. The research findings thus emphasise the need for creative new partnerships between government, communities, non-governmental organisations (NGOs) and other stakeholders to tackle the human dimensions of MPAs.

#### **Guidelines on integrating the human dimensions of MPAs into planning and decision-making**

A key outcome of this research project has been the development of a set of *Guidelines for integrating Human Dimensions into MPA Planning and Management*. These guidelines seek to clarify what is meant by HUMAN dimensions, what methods and tools can be employed to understand them and what steps must be followed to incorporate them into MPA planning and management.

The Guidelines respond to the growing call both internationally and in South Africa from researchers, conservation planners, managers and communities for a more people-centred approach to MPA planning and management, recognising that conservation and fisheries management objectives will *not* be realised unless human dimensions and societal concerns are adequately addressed. The Guidelines provide a step-by-step framework that will



assist those involved in planning and managing MPAs to identify and address the human dimensions of MPAs throughout the planning and management process. The Guidelines include case studies and fact sheets to illustrate each of the key human dimensions as well as a resource list for further information.

The DEA Directorate responsible for MPA governance in South Africa, the Directorate of Coastal Biodiversity and Conservation has committed to supporting the implementation of these Guidelines and it is hoped that conservation agencies, researchers, communities and other stakeholders will find the Guidelines useful in supporting their efforts to secure effective and equitable Marine Protected Areas in South Africa. Copies of the Guidelines are available at

[http://www.wwf.org.za/media\\_room/publications/?11401/People-centric-guidelines-for-MPA-management](http://www.wwf.org.za/media_room/publications/?11401/People-centric-guidelines-for-MPA-management). ☞



The Coastal and Marine Research Institute (CMR) at Nelson Mandela Metropolitan University presents an **Introductory Course to Marine Bioacoustics** 26-27 May 2015

This 2-day course provides delegates with a thorough introduction to the fundamentals of marine bioacoustics and impact assessments of underwater noise.

Aimed at non-acoustic experts, students, researchers, government employees and industry personnel, this course will help develop a clear, quantitative understanding of the usage of sound by marine wildlife, the risks of man-made noise to marine wildlife, and how to potentially manage and mitigate these risks.

Deadline for registration:  
31 March 2015

Click [here](#) for further course information.

Contact person: [Dr. Stephanie Plön](#)



## Extraordinary tufa stromatolites ecosystems in Port Elizabeth

A new research project by Nelson Mandela Metropolitan University have discovered extraordinary tufa stromatolites on the southern coastline of Port Elizabeth, this creates a very unique ecosystem.

Stromatolites are layered bio-chemical accretionary structures formed in shallow water by the trapping, binding and cementation of sedimentary grains by biofilms (microbial mats) of microorganisms, especially cyanobacteria. Stromatolites provide the most ancient records of life on Earth by fossil remains which date from more than 3.5 billion years ago.

Tufa is a variety of limestone, formed by the precipitation of carbonate minerals from ambient temperature water bodies. Geothermally heated hot-springs sometimes produce similar (but less porous) carbonate deposits known as travertine. Tufa is sometimes referred to as (meteogene) travertine.

The first extant marine tufa stromatolites along the southern African coast were described in the early 2000s from Cape Morgan and later investigated in some detail from a geochemical and geomorphological point of view. Located on a dolerite headland shaped into a wave-cut platform, these stromatolites consist of continuous, extensive laminar growths or discrete accretions bridging gaps between separate boulders. In either case, the formation results in enclosed rock pools capable of trapping carbonate-rich groundwater seeps. Although other rare, isolated examples of similar formations have been reported to occur from Port Elizabeth to Tofu in Mozambique, the recent discovery of

numerous and closely spaced living stromatolites on the coastline south of Port Elizabeth appears to be extraordinary.

While the Cape Morgan headland includes about 50 stromatolite colonies, each of about 3m<sup>2</sup> on average, the formations mapped so far to the west of Cape Recife include 540 colonies, ranging in cover from < 1 m<sup>2</sup> to > 100 m<sup>2</sup>.

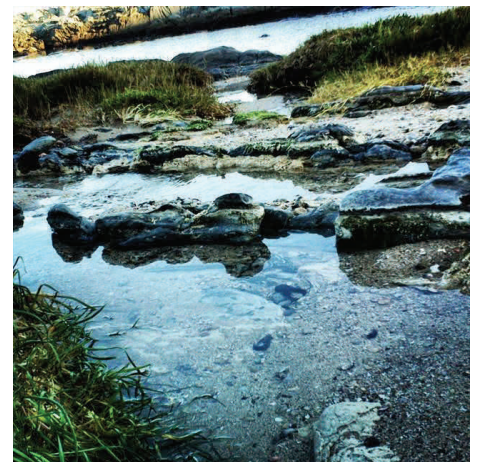
Stromatolites are important because they are regarded as the oldest type of calcified formations where cyanobacteria play a major role in the deposition of calcite crystals, either directly on the cell surface or, more commonly, through inclusion within the mucilaginous sheath that surrounds the cell. The process requires CaCO<sub>3</sub> supersaturation of the water, which only occurs in today's marine environment in a few special circumstances, e.g. under states of hypersalinity, excess evaporation, or mixing of extremely different water types.

As stromatolites date back in the fossil record at least 2.7 to 3.5 billion years, the study of the few extant colonies still remaining in the marine environment may be instrumental in understanding the hydrospheric conditions that prevailed at the onset of life on Earth.

Southern African tufa stromatolites are regarded as unique in their nature, because they typically



Stromatolites are really a fossil cyanobacteria colony. Stromatolites are built by cyanobacteria (often incorrectly referred to as blue-green algae, they are not algae).



When they are growing they are all squishy but as they dry out they become calcified. They don't look like much but this form of life has been around for, at least, the last 3.5 billion years.



Colonies to the west of Cape Recife include 540 colonies, ranging in cover from < 1 m<sup>2</sup> to > 100 m<sup>2</sup>.





occur at the interface between freshwater seepage points and the marine penetration. The closest type to those discovered on the south-east coast of South Africa are the tufa deposits recently reported from the south-west coast of Western Australia. Here, however, most tufa formations are associated with inland spring discharges, while the South African types are all upper intertidal to supratidal in position, with strong and regular marine influence.

#### Metazoan communities found in the Port Elizabeth areas

With few exceptions, metazoan (animal) communities have generally been regarded as incompatible with the very existence of stromatolites. However, a diverse macrofauna community characterise the stromatolite pools of the Eastern Cape, with euryhaline species occurring throughout the system and typical freshwater and marine species alternating each other at pool dominance, or even coexisting in different layers of each pool.

Euryhaline organisms are able to adapt to a wide range of salinities. An example of a euryhaline fish is the molly (*Poecilia sphenops*) which can live in fresh water, brackish water, or salt water.

A case in point is provided by the true crabs (brachyurans), which exhibit abundances of a typical freshwater species, *Potamonautes perlatius* next to a typical marine intertidal dweller, *Cyclograpsus punctatus*. The two crab species can be found occasionally in the same barrage pool, but at different depths, with the marine species generally under rocks in the deeper parts where the denser saline water sinks. Mass mortality of *Cyclograpsus punctatus* has been observed when pools become freshwater-dominated due to an imbalance of flows from the two



Southern African tufa stromatolites are regarded as unique in their nature, because they typically occur at the interface between freshwater seepage points and the marine penetration.

sources, or turbulent conditions force mixing and the breakdown of haloclines in the water-column.

Stromatolite pools also appear to be colonised by a unique suite of common fish species, most of which are usually associated with estuaries. It is unknown to what extent these unique habitats serve as a fish nursery. In the fresher pools, there are often frogs and dense aggregations of tadpoles.

Click [here](#) for the full report.

#### Reference:

South African Journal of Sciences  
Perissinotto R, Bornman, TG, Steyn P-P, Miranda NAF, Dorrington RA, Matcher GF, et al. Tufa stromatolite ecosystems on the South African south coast. S Afr J Sci. 2014;110(9/10), Art. #2014-0011, 8 pages. <http://dx.doi.org/10.1590/sajs.2014/20140011>

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## 3rd Southern African Shark and Ray Symposium

False Bay, Cape Town  
7 – 9 September 2015

Hosted by Shark Spotters - in partnership with the Save Our Seas Foundation's Shark Education Centre

The Southern African Shark and Ray Symposium is a biannual meeting of the academic community of Southern Africa who are currently conducting research on these taxa.

Registration and first call for abstracts is now open. All topics related to chondrichthyan research will be considered.

Please direct symposium correspondence to: [symposium@sharkspotters.org.za](mailto:symposium@sharkspotters.org.za)

#### Important dates:

31 May - Call for abstracts ends  
30 June - Presenters notified  
15 July - Early-bird registration ends

#### Contact person:

Dr. Alison Kock  
Tel: +27 (0) 726619516







# Prorocentrum sp. in our midst

By Louw Claassens

Knysna Basin Project,  
Department of Zoology and  
Entomology  
Rhodes University

The Knysna Estuary is home to the endemic and endangered Knysna Seahorse (*Hippocampus capensis*). During recent research on this unique animal in Thesen Islands Marina, Knysna Basin Project researchers noted another inhabitant of the marina – albeit a new one. Thick reddish colonies of *Prorocentrum rhathymum* were noted on macroalgae (*Codium tenue* and *Asparagopsis taxiformis*) during a preliminary seahorse survey. At first the tiny dinoflagellate could not be identified and the new inhabitant's identity remained a mystery.

Samples of the dinoflagellate were collected on the 29<sup>th</sup> of October 2014 and taken to Rhodes University for electron microscopic study. Photos were distributed on ResearchGate in the hope that someone in the research community might be able to identify it. Most replies indicated that it was *Prorocentrum* sp. The photos were subsequently sent to Prof John Bolton from UCT and with the help of Stuart Sym (WITS) and Takeo Horiguchi (Hokkaido University) the mysterious flagellate was identified as *Prorocentrum rhathymum*.

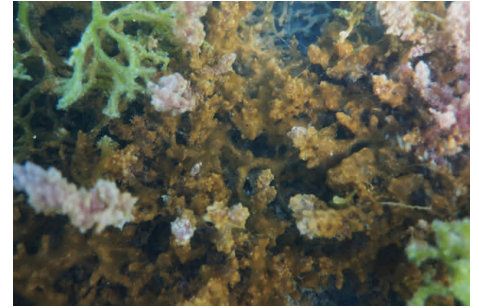
The type specimen, *Prorocentrum micans*, was described by Ehrenberg in 1834 and since then 32 planktonic and 33 benthic species have been reported. Later taxonomic history of *Prorocentrum rhathymum* is interesting as it was originally suggested that this species is synonymous with *P.*

*mexicanum*. In 2003 it was however found that *P. rhathymum* is morphologically different to *P. mexicanum* in the following ways:

- (1) *P. rhathymum* does not have a poroid (simple unchambered hole through a diatom valve) on the cell surface, whereas *P. mexicanum* has numerous poroids on the cell.
- (2) *P. rhathymum* has a simple collar-like spine in the periflagellar area (small v-shaped depression) and an ovoid shape in lateral view, whereas *P. mexicanum* has one 2- or 3-horned spine in the periflagellar area and a lenticular shape in lateral view, with a thicker anterior region.

*Prorocentrum* spp. are phototrophic dinoflagellates which occur in marine waters world-wide. Most benthic *Prorocentrum* spp. have been found to be toxic and is thus of great importance to scientists and the public. According to Botes *et al.* (2003) *P. micans*, *P. rostratum* and *P. triestimum* are common along the South African coast. Literature on the occurrence of *P. rhathymum* in South Africa could however not be found. Dense colonies of *P. rhathymum* were first noted in Thesen Islands Marina in August 2014. The colonies were noted to occur in areas with low tidal exchange and flow rates. Smaller sections broken off from the larger layers tend to float to the surface. Dinoflagellate colonies were also noted on bare sediment.

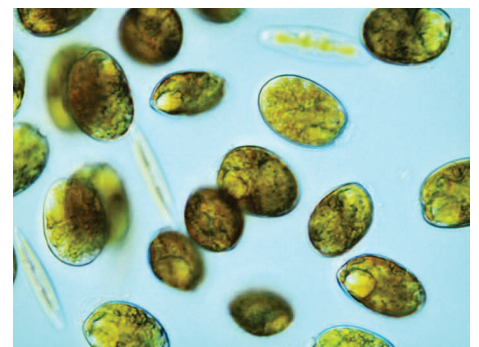
Some studies suggest that habitat might be a discernible factor between species seeing that *P. rhathymum* is epiphytic and benthic whereas *P. mexicanum* is planktonic. Planktonic cells of *P. rhathymum* have



Thick layer of *P. rhathymum* on *Asparagopsis taxiformis*. In Thesen Islands Marina, Knysna Estuary.



Dense colony of *P. rhathymum* on *A. taxiformis* and *C. tenue*. In Thesen Islands Marina, Knysna Estuary.



*Prorocentrum rhathymum*. The oval cells range in size from 36 µm – 48 µm long and 32 µm to 17 µm wide.

however been noted which could suggest that habitat is not a critical factor in distinguishing between the two species.

In 1987 Anderson & Lobel established that *P. rhathymum* contains water-soluble fast-acting toxins with hemolytic effects. A study done in 2012 by Glibert *et al.* found that *P. rhathymum* contained Okadaic acid (toxin that accumulates in bivalves and causes diarrheal shellfish poisoning) with hemolytic toxins. The dinoflagellate has also been



connected with Ciguatera poisoning – a food chain induced disease affecting herbivorous fish which then become toxic when eaten.

Additional research on the occurrence of *P. rhathymum* in Thesen Islands Marina is required to contribute in understanding the role this dinoflagellate plays in the marina environment.

We wish to acknowledge the assistance of Prof J. Bolton (University of Cape Town), Stuart Sym (University of Witwatersrand) and Takeo Horiguchi (Hokkaido University) in the identification of *P. rhathymum*.

#### Further reading:

Anderson, DM & Lobel, PS. 1987. The continuing enigma of Ciguatera. *Biological Bulletin* 172. Pp 89-107.

Botes, L; Smit, AJ & Cook, PA. 2003. The potential threat of algal blooms to the abalone (*Haliotis midae*) mariculture industry situated around the South African coast. *Harmful Algae* 2. Pp 247–259.

Cortes-Altamirano, R & Sierra-Beltran, A. 2003. Morphology and taxonomy of *Prorocentrum mexicanum* and reinstatement of *Prorocentrum rhathymum* (Dinophyceae). *Journal of Phycology* 39. Pp 221–225.

Glibert, PM; Burkholder, JM & Kana, TM. 2012. Recent insights about relationships between nutrient availability, forms, and stoichiometry, and the distribution, ecophysiology, and food web effects of pelagic and benthic *Prorocentrum* species. *Harmful Algae* 14. Pp 231–259.

Lim, AS; Jeong, HJ; Jang, TY; Kang, NS; Lee, SY; Yoo, YD & Kim, HS. 2013. Morphology and Molecular Characterization of the Epiphytic Dinoflagellate *Prorocentrum* cf. *rhathymum* in Temperate Waters off Jeju Island, Korea. *Ocean Science Journal* 48(1). Pp 1-17. ☞

## Growing capacity in aquaculture to improve food security

By Kerry Peter

On behalf of the Department of  
Ichthyology and Fisheries Science,  
Rhodes University

Rhodes University's Department of Ichthyology and Fisheries Science (DIFS) has joined a partnership with Lilongwe University of Agriculture and Natural Resources (LUANAR) (Malawi), the University of Eldoret (Kenya), and Makerere University (Uganda) to develop and refine the curricula of PhD courses in aquaculture and fisheries science to enhance the capacity of our continent to improve food security and the livelihoods of the people who depend on these industries.

In response to a general decline in capture fisheries in Sub-Saharan Africa, the governments in this region have encouraged investments into the aquaculture sector, both at smallholder and commercial levels, as an alternative. The aquaculture sector, however, needs technologically skilled human resources to guide it, but the region lacks a vibrant regional “fit-for-purpose” training program that holistically contributes to a lasting solution to this enduring food security challenge.

Strengthening the links between the Higher Education Institutions (HEI) in the region and a sharing of teaching and research capacity, modern technologies and research into the demands of the fisheries and aquaculture sector are integral to increasing fish production and the sustainable management of resources.

Growing regional capacity through training at PhD level in aquaculture and fisheries science is imperative to this cause. This is the incentive behind the “Concerted Fit-for-purpose PhD training in aquaculture and fisheries to improve food security and livelihoods in Sub-Saharan Africa” project. This project is one of a number of projects that form part of the Edulink II Program that is funded by the African, Caribbean and Pacific Group of States - European Union (ACP-EU) Co-operation Programme in Higher Education.

The objectives of the project are to review the capacity and teaching facilities at the partner institutions, visit a lead aquaculture/fisheries science teaching institution in Africa and in Europe, develop PhD curricula in aquaculture and fisheries science, constitute an academic advisory board and to start implementing the curricula.

With a well-established and internationally recognised PhD programme, the DIFS already has experiences that it can share with its partners in addition to a model for the joint supervision of students that would allow the DIFS and South African Institute for Aquatic Biodiversity (SAIAB) staff to partner in capacity building and staff exchange programmes. With facilities such as the Rhodes and SAIAB libraries, good research facilities, the capacity in water research offered broadly at Rhodes, access to the staff training services offered by the Centre for Higher Education, Research, Teaching & Learning (CHERTL) and the experience of the Rhodes international office, Rhodes has much to bring to the table.



The DIFS believes Rhodes is also going to benefit from the development of strong partnerships with these other African universities, which may in turn attract additional international students. The programme will also allow Rhodes to ensure that these international students have a good foundation from which to work and a working knowledge of the programme will also allow them to design their own PhD and MSc curricula to cater for students from more diverse academic backgrounds.

“Our role at Rhodes is to initially assist and advise in developing the curricula with opportunities to possibly get involved in drafting them and to possibly form collaborative student supervisory teams with staff from the partner universities in time to come,” said Dr Cliff Jones, a senior lecturer in the DIFS and project partner. “Ultimately, our own aquaculture and fisheries PhD/MSc curricula at Rhodes is likely to benefit from this project too — there is always room to improve and grow.”

In July 2014 Drs Daniel Sikawa (LUANAR), Cliff Jones (Rhodes), Phillip Raburu (Eldoret) and Robinson Odong (Makerere) attended the RUFORUM (Regional Universities Forum for Capacity Building in Agriculture) Biennial Conference in Maputo, Mozambique where they facilitated a conference side-event interaction among fisheries and aquaculture actors in Africa and beyond. Presenting on the Edulink II Program, their discussions involved graduate students, university lecturers, fisheries and aquaculture actors, policy specialists and curriculum analysts. The session identified the gaps and challenges in aquaculture PhD training and matched them to the training and research needs at higher institutions of learning.

The project partners met again at Rhodes at the end of August to identify what the DIFS and Rhodes as a whole has to offer the project going forward and to develop a work plan for 2015. In addition to interaction with the DIFS staff, the workshop included meetings with Director of The South African Institute of Aquatic Biodiversity (SAIAB) (Dr Angus Paterson), the Director of the Centre for Higher Education, Research, Teaching & Learning (CHERTL) and Dean of Teaching & Learning (Prof Chrissie Boughey), and the Director of the International Office (Ms Orla Quinlan). The purpose of the meeting was to introduce the partners to Rhodes and give them an idea of how DIFS runs its programs, and to expose them to what Rhodes might have to offer in developing their own curricula.

The visitors were impressed by the diverse research capacity that DIFS and SAIAB has to offer, and with other facilities at Rhodes such as the International Office and CHERTL which provide a working model of how they potentially are going to partner with Rhodes in time to come. ✂



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## MSc Research Opportunity Aquaculture



Rhodes University and  
Zhejiang University (China)  
Collaboration

Rhodes University and Zhejiang Ocean University have established a collaboration to support the exchange of staff and students at MSc level. Zhejiang is a leading 'ocean' university on Zoushan province just North of Shanghai. One speciality is aquaculture with special emphasis on shellfish breeding and stock enhancement. Rhodes University currently has a programme on abalone stock enhancement and has agreed to a research collaboration in the broad area of stock enhancement and fishery restoration.

This is an excellent fully funded opportunity for international exposure for a promising research student.

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## Celebrating Marine Week with The Craggs

*By Jennifer Angoh*

Global Vision International Volunteer (GVI), Garden Route National Park

Hardly able to contain our excitement, the kids and I quickly lost our shoes and rolled-up our pants. Gone the neat attire, we were ready for the surprises Natures' Valley had reserved for us.

I've been playing Dora the explorer for the past few weeks, months even, and "Marine Week" was no exception. Joining hands with Natures' Valley Trust (NVT), SANParks organised a day at the seaside for The Craggs Primary school grade 7 students. This year's National Marine Week theme was # OCEANS 70/20: Decoding Mysteries, Optimising Opportunities. Yes, I know... not even the OCEANS can escape social media nowadays (hashtags everywhere!).

Anyhow, in this context though, the acronym OCEANS was derived from the phrase "Opportunities for Community and Economy: Advantages from Natural Services". Talking about communities and opportunities, South Africa is celebrating 20 years of freedom this year. My interpretation; equal opportunities for every member of the community, yay! Hence, the theme also reflecting what has been achieved in the past 20 years by the South African government and what is being planned for the 20 years to come.

And, if you were wondering about where the 70 fits in? Well... it's for the 70% of Earth's surface that's covered by the mysterious oceans, waiting to be explored, understood and utilised in a sustainable manner. Humans have been collecting seafood and



Craggs Primary School at the Natures' Valley Beach during Marine Week 2014

making use of the oceans' resources and services for tens of thousands of years. However, the ways and extent to which we exploit those marine resources have undergone great changes over time. Given the ever-growing list of scientific discoveries and innovations, it became easier to make use of once inaccessible resources. Thus, now more than ever, we need to understand the difference between "use" and "abuse". Not only do we benefit from substantial harvests, but amongst other tourism, recreational activities and climate regulation depend heavily on healthy oceans.

In an attempt to teach our little leaders of tomorrow the importance of oceans and why we should optimise instead of maximise our use of the seas, lagoons and coasts, we organised small lessons on the beach for them. Assembled around a rock pool, the children were scrutinising each and every mussel, anemone, sea urchin, klipvis, etc..., that Richmond Gewers, Tsitsikamma National Park's People and Conservation officer, was fervently describing.



Ruth Moeti (in white hat) from Natures Valley Trust, teaching kids about the influence of oceans on climate.



Predators chasing their prey.



Playing "I spy" in the rockpools.



That day, my new *maatjies* (friends) also got to learn more about nature's complexity and species interdependence (humans included) by taking part in interactive games. Through an enactment exercise, in which the children themselves portrayed major organisms of specific marine food chains, the latter were introduced to the concept of ecological pyramid (producers and primary, secondary and tertiary consumers). Each and every one of the species they role-played are integral part of their biological communities and the slightest disturbance could eventually disrupt balanced ecosystems. ☞



Richmond Gewers (green hat) busy interpreting .

## Alien invasion in the MPAs

*By Jennifer Angoh*

Global Vision International Volunteer (GVI), Garden Route National Park

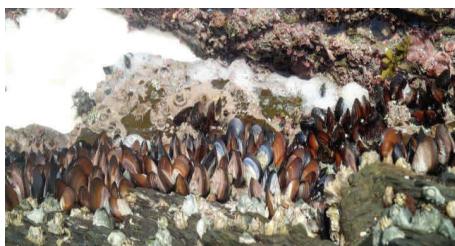
Dazzled by several animals washed ashore, I could not help but wonder how pristine the MPAs (Marine Protected Areas) really were.

I was definitely not the only perplexed one after all. A few weeks ago, I had the chance to assist Ben Brooker, a Masters student from the University of Cape Town, who was doing field work in the Tsitsikamma MPAs. South Africa has 23 MPAs along its coastline that aim at protecting marine coastal habitats by prohibiting or restricting anthropogenic disturbance. Conservation efforts in the MPAs have so far held up direct habitat degradation. Nevertheless, while no-take areas have been established to maintain biodiversity and ecosystems functions, little was known and done about the introduction and control of dangerous alien species populations.

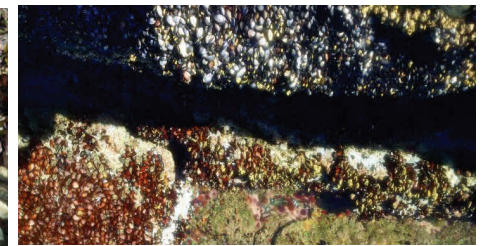
Strolling on the rocky shores, few are aware of inconspicuous alien species blending in so subtly with the native populations. But, one should not be fooled by the "shell" and belittle the threats that some non-indigenous, more specifically invasive species, can pose. For instance, thanks to its phenomenal phenotypic plasticity, the Mediterranean mussel

(*Mytilus galloprovincialis*) shell can range from black to blue to brown making it very difficult to spot and remove. This species of mussel was first recorded on the coastline of Tsitsikamma in 1993 and in a decade has already started displacing the competitively inferior native brown mussel (*Perna perna*) and limpet *Scutellastra granularis* from mid-shore areas. In other parts of the country, the Mediterranean mussel populations have also restricted the native black mussel, *Choromytilus meridionalis*, to inundated areas and out-competed the ribbed mussels, *Aulacomya ater*. Now that the Mediterranean mussels' offshore larval pool is too vast to be contained, control of the invasive mussel populations is thought to be impossible.

"*M. galloprovincialis* has out-competed the limpet *S. granularis* on semi-exposed and exposed rocky shores on the West Coast. It is likely that this has had a negative impact on the traditional harvest of this limpet species by artisanal fishers for use as lobster bait. This appears to be the only known negative socio-economic impact for this species. On the other hand, higher growth rates for this species relative to the local mussel species, has almost certainly contributed significantly to the success of the local mussel culture operations." – National Dept. of Agriculture, 2012.



Can you spot the intruders?



Bluish coloured Mediterranean mussels (top) and native brown mussel (bottom).





It cannot be denied that some alien species can have valuable socio-economic benefits. In 2010, South African mussel aquaculture was valued at ZAR9.1 million. However, biological impacts of invasive species can be irreversibly detrimental to native biota. In the long run, invasive species may hinder sustainable development through the pressures they exert on the ecosystem.

Whether in or outside the MPAs, South African marine ecosystems remain vulnerable to anthropogenic impacts (E.g. subsistence, recreational or commercial use, habitat modification, accidental or deliberate introduction of invasive species, climate change and pollution). While management authorities develop critical policies, taking into consideration both ecological and socio-economic factors, each and one of us can further contribute to the safeguard of the oceans by making the right choices.

“Each one of us can make a difference. Together we make change”- Barbara Mikulski.

#### How can you help?

For one, if you are in South Africa, choose to eat fish only from sustainable fisheries such as snoek, hake, gurnard and calamari. You can even check the status of a fish before you order or buy it. SMS the kind of fish or seafood, e.g. squid, to 079-499-8795 and a return message will tell you about the fish. For more information you can visit [www.wwfsassi.co.za](http://www.wwfsassi.co.za).

- Green- fine to eat
- Orange-uncertain, so eat less often
- Red- it is illegal to sell these fish. The fishery is either over-exploited, damages the ocean, or is illegal.

Also on the help list;

- Obey marine regulations and refrain from destroying marine habitats.

- Help protect the coast taking part in conservation programs like Coastcare and the Adopt-a-beach initiative.
- Educate others about the importance of a healthy ocean.
- Report problems when you see one.

For more information on the Mediterranean Mussel's status in South Africa refer to:-

[http://www.nda.agric.za/doaDev/sideMenu/fisheries/03\\_areasofwork/Aquaculture/BIODIVERSITY/M.%20galloprovincialis%20BRBA%2012.12.12.pdf](http://www.nda.agric.za/doaDev/sideMenu/fisheries/03_areasofwork/Aquaculture/BIODIVERSITY/M.%20galloprovincialis%20BRBA%2012.12.12.pdf)

DAFF. 2012. Department of Agriculture, Forestry and Fisheries Aquaculture Annual Report 2011 South Africa. ISBN: 973-1-868-71-355-4. ☞



Ben Brooker estimating percentage cover of mussels.

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### Utilization of polychaetes as bait:

#### narratives and experiences from artisanal fishers along a tropical creek in Kenya

By <sup>1</sup>Charles Kihia, <sup>2</sup>Agnes Muthumbi, <sup>3</sup>Julius Okondo, <sup>2</sup>Aniel Nthiga and <sup>2</sup>Vincent Njuguna

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Artisanal fishers harvest and use excavated polychaete worms, locally called *choo* for fishing, along nearshore fishing grounds. The following accounts are garnered from interviews and observation made during sampling expeditions made among fishers along a tropical mangrove fringed creek, Mida creek Kenya.

Fishers decide to harvest polychaete baits either in the morning before going fishing or later in the day after coming from fishing, for use the following day or night. Polychaete bait harvesting is done at low tide, when the intertidal zone is exposed. The fisher walks through the mangrove forest till the edge of the mangrove forest. The site chosen is the seaward edge of the forest dominated by *Avicennia* or *Rhizophora*. He observes for previous excavations and tends to select areas that do not show recent excavation. In his hand, is a 1m mangrove rod called a *chulo*, and a container for putting the harvested bait (Plate 1). The plastic container measures about 20 by 10 cm and may have a capacity of 2- 3 liters.

The fisher examines the area to be excavated as they walk along the forest edge and may be seen bending, every now and then to examine the sites. Fishers indicate

that the edge of the mangrove forest is the preferred site, however, proliferation of mangrove roots make it harder to excavate. This may need the use of cutting implements. In case they lack cutting implements, which is common, roots are pulled by hand. In some areas, large-scale excavation has led to death and recession of mangrove trees (Plate 2). To avoid such laborious work, they chose adjacent areas with fewer roots. Fishers state that they look for evidence of polychaete presence by observing holes excavated by the polychaete. These holes are smaller (>5mm), than the holes made by crabs (1-2 cm), they also have a mound of round black pellets at the edges. He then chooses sites where there are more of these holes and the more, the higher the probability of harvesting more baits within a short time. Another feature that aids in identifying a suitable excavation site is the relative firmness of the substrate. Fishers indicate that the substrate at recently excavated sites is softer. One may sink up to the knee, at such sites. Fishers also avoid zones adjacent to the sea stating that the bait does not live there. On identification of a suitable site, fishers put aside the container and begin excavating.

The *chulo* is used for digging into the sandy-muddy substrate. Digging is commonly begun at the lower edge of the excavation, heading towards the forest, presumably because the worms tend to run away on detecting the digging vibration. The *chulo* is driven into the mud with relatively force, to drive the pointed edge at least 30-50cm into the substrate (Plate 3). With a rocking motion the mud is then pulled back and removed carefully, but quickly. Worms and



Plate 1: Polychaete bait (*choo*) harvester with an excavating rod (*chulo*) preparing to excavate at intertidal shoreline, Dabaso, Mida creek, Kenya.



Plate 2: Edge of mangrove forest showing extensive excavation at the mangrove root zone.



Plate 3: A fisher excavating for polychaete bait (*choo*).

worm burrows are then exposed. The fisher proceeds to follow such worms seen, in subsequent digs at the hole created. The excavated material is placed towards the seaward edge of the excavated hole. This is done to reduce influx of seawater. The depth (~50 cm) of hole excavated is determined by changes in substrate quality. Generally, the excavated band is muddy, while the lowest depth not excavated, is sandy. Fishers indicate that there are no more worms when this sandy substrate is revealed. The hole is then widened, depending on the presence of



spotted bait holes at the site. Fishers lack a standard excavated dimension, but the extent is determined by the presence of further evidence of worms i.e. worm burrows, escaping worms. Digging ceases when no new worms or burrows are revealed, the hole is abandoned, without returning the displaced substrate.

The bait is removed by carefully pulling it from the exposed end. Care needs to be taken to avoid cutting the worm. The worms split easily, but still remain viable. Newly caught bait is washed slightly in seawater and dropped into the container (Plate 4). The fisher continues excavating until he has enough bait, depending on the fish he is targeting and the intensity of fishing. Fishers state that, they have enough bait when the container is about quarter-full. Depending on whether the bait are to be used immediately or the next day the fishers proceeds for fishing. Examination of the bait reveals they belong to large tube dwelling family Eunicidae and genus *Marphysa*, distinguished by large jaws on their anterior appendages. Two species *Marphysa mossambica* and *M. macintoshi* have tentatively been identified.

When proceeding to fish, the fisher has with him; the bait container with bait previously harvested, a length of fishing line attached to 10 cm<sup>3</sup> Styrofoam float, 2-4 hooks of size 15 to 24 (Plate 5), and a canoe. Use of canoe seems to depend on ownership and prior arrangement. It is not clear what agreements or concessions are attached to the use of canoe. However, it may seem that a share of the catch may be part of the agreement, especially if the fisher is highly successful. The fisher will use the *podo* (a long thin mangrove pole), for steering and propelling the canoe to his preferred fishing

site.

He will commonly choose a site where there are no other fishers on that day, and hence it's important for him to approach the site early. He proceeds to attach pieces of bait to the hooks. He chooses worms from his container that will cover the whole hook. After attaching bait to all his hooks, he proceeds to throw the line into the water. Extra hooks are attached to the edge of the boat, to avoid accidental injury in the boat. Fishes caught are reeled in and more bait attached to the hooks. He continues to fish until the tide turns or until he has enough catch. Small fish caught are placed into a small woven basket, while larger fish are placed at the bottom of the boat. Extra bait is either discarded into the sea or kept for the next fishing trip, depending on its condition. Worms are said to be ideal because they remain viable for longer periods.

The fresh fish caught are called *mboga* by the fisher if they are few (~1-2kg). These are landed at the beach and are neither weighed nor reported (Plate 6), but are taken to the home for further processing and consumption. When there is a larger catch, the fisher divides his catch into *mboga* and those for sale to the fish traders. The traders, who will have been congregating at the beach just before the turn of the tide, will take possession of the fishes set aside for sale. They may even wade into the water to assist in carrying the fish using plastic buckets. The amount of fish will be estimated by number (for small fish), or weight (using a spring balance at the shore) and the amount of payment agreed. No exchange of money was observed at the beach. It is possible that the women traders take the catch on loan or by prior



Plate 4a: A fisher's quarter-full container of harvested polychaete bait.



Plate 4b: a single full length bait from excavation in the creek.



Plate 5: A fisher's hook and line set ready for deployment in fishing.

arrangements. Sometimes the fisher may take a light meal at the beach, which is sold by the women traders at the landing beach. There does not seem to be much communication between the fishers and the traders, indicating that most arrangements are made by age old understanding or prior consensus. While the women traders talk to each other animatedly and constantly, the tired looking fishers will continue eating or resting and afterwards take their catch homeward with few words of departure. ☞





## South African Hope Spots are unique



South African Hope Spots are unique and have a place for you, your family or your business, club, school, university and they are our Home of Hope - *Ikhaya lethemba*. The six South African Hope Spots launched in December 2014 are fully people orientated and driven by communities of caring people drawn from all sectors of society.

The Hope Spot initiative in South Africa - *Ikhaya lethemba* (The Home of Hope) - addresses critically important South African issues and is totally inclusive, aiming to harness the power of people by involving them in positive action.

In South Africa, where so many impoverished people depend upon the seas for their livelihoods and where so many people would like to make a difference, but are unsure what to do, the Hope Spots can provide answers. [Mission Blue](#) defines Hope Spots as special conservation areas that are critical to the health of the ocean, in SA, the emphasis is more on the human needs and their role in providing a healthier environment for themselves than on simply conservation, hence the term *Ikhaya lethemba*.

While Hope Spots can be pristine areas, few are. In fact people have a smaller role to play in pristine areas than they do if they are challenged with a degraded area. Being part of a campaign to improve a degraded area, where the improvements are readily monitored and measured can be rewarding. In a pristine area the role of people is to promote pride and appreciation, use the area for educational purposes and for sound research, and to monitor effects of global warming and more.

To harness the power of people there is a need to promote awareness, education and importantly, involve as many people as possible in positive actions. Through such activities people better understand, begin to care and know. Once people care, communities of caring people develop and a positive ethic of caring action develops.

Whereas many protected areas discourage public involvement, Hope Spots in South Africa are geared to involving the public, especially children, clubs, societies, NGOs who will work with the authorities to make their areas special places of fun, hope, education, conservation, tourism and sustainable angling and fishing.

Another goal of Hope Spots is to involve people in order to establish a better understanding of the environment. Projects within the Hope Spots will bridge the gap between researchers in a manner that makes information and knowledge available to all as fostering an understanding and love for the creatures in the Hope Spot and the seas will lead to caring. In addition, citizen science will be promoted so that members of the public can work with researchers, and in some cases once trained work alone, to help create knowledge in citizen science







programmes. So the public will be part of important research and make valuable contributions.

#### **SA Hope Spots are inclusive**

SA Hope Spots are inclusive, encouraging everyone who uses the sea, whether recreationally, for commercial purposes or because their survival depends upon the sea to be part of the Hope Spot. In planning and developing Hope Spots the inclusiveness draws in everyone so that each stakeholder is given an opportunity to play a positive role in their space. Wisdom and understanding are necessary to ensure sustainability and these need to be based on top quality research.

The sustainability and success of Hope Spots is dependent upon them having robust educational programmes that are CAPS compliant and reach everyone, promoting understanding and pride in the Hope Spot of which they, the learners are part.

It is absolutely essential in the inclusive approach to ensure that businesses embrace the blue and green economies as well as become conscious of the environmental context in which they operate. Fortunately, business communities in the Hope Spots are embracing the Hope Spot concepts, particularly where the Business Chambers are playing a leadership role.

The inclusivity ensures that there is a role for all players: academia, government, business, NGOs, societies, clubs, schools, general public and more. It is clear, however, that the central institutional role resides with government, especially as parks and reserves are their specific mandate.

#### **Education Centres & Education Trust Fund**

A vision for every SA Hope Spot is that, in

time, it will have a Sustainable Education and Skills Centre for Employment (SEAS Centres for Employment), which are totally green buildings in which top class education and training takes place for all, but particularly underprivileged children. Part of the package in developing the Hope Spots is to launch an Educational Trust .

The success of Hope Spots depends upon them reaching all stakeholders and helping them to understand their environment, take a pride in their Hope Spot and assume an ownership, especially of their own positive actions.

The education trusts are especially important in helping impoverished coastal communities as they will help alleviate poverty, promote food security and sustainability through education of coastal communities as well as finding alternative skills and developing sustainable livelihoods.

#### **Hope Spots bridge gaps**

Two important developments are taking place. Firstly, researchers which were working in isolation are now being drawn together under the Hope Spot umbrella. Secondly, if the researchers are not aware of the spectacular findings of other researchers, then how can the public, municipalities, businesses, schools and others be informed about the wonders of their own Hope Spots?

Recognizing that the currency of researchers is to publish peer reviewed papers and produce top class graduates, a role for Hope Spots is to translate data into forms that can be used by stakeholders. Similarly, it seems that nearly all users of the seas and coasts are "citizen scientists" or would like to be citizen scientists. Once again, the Hope Spot NGOs can be the bridge between the data

Six SA HOPE Spots were launched in December 2014:

- Algoa Bay
- Aliwal Shoal
- Cape Whale Coast
- False Bay
- Knysna
- Plettenberg Bay

collected by the public and the institutions managing and sharing those data.

SA Hope Spots will not store the data; rather the current proposal is that South African Environmental Observation Network ([SAEON](#)) will be the information hub making data available to South Africans through the Hope Spots, with SST co-ordinating. Similarly, information from the public, particularly those involved in citizen science will be provided by the Hope Spots to the SAEON hub.

The manner in which Hope Spots, working through SST, will translate information into useable forms will be by producing well illustrated readable books, provide content and illustrations for educational books giving a local focus while remaining completely in-line with the curriculum (CAPS); use radio, educational films and where possible television; produce popular articles and use educational plays and activities on action days. The news media will also be used for announcements.

#### **SA Hope Spots are a Forum for Positive Collaboration**

Hope Spots are not MPAs or reserves, but are areas in which people can contribute to positively improve the environment. All Hope Spots in South Africa either abut or include MPAs or marine reserves and this enables people to work more closely with the government authorities to help meet local, provincial and national goals. Both are



winners: the public feel more positive towards conservation areas and the authorities which run them and they are pleased to be contributing positively to their country. The government benefits from the positive guided from the public and academia.

Wherever one involves the public in issues of conservation there are dichotomies. On the one hand there are the conservation enthusiasts and volunteers. On the other, those to whom conservation and sustainability are an anathema and the words 'environmental protection' are even worse. Many of those who are antagonistic towards conservation issues are the communities who see steps to protect nature as steps to take away their livelihoods.

In the South African description of Hope Spots, the words conservation, sustainability and protection hardly feature; rather the emphasis is on encouraging people to play positive roles in improving their environment for themselves. The Hope Spots aim to provide a forum for positive collaboration.

To many the rift between fishermen and authorities seems intractable, but Hope Spots do offer an alternative to what seem to be intractable problems, especially if positive lessons from elsewhere in Africa might be applied within South African Hope Spots.

To harness the power of people there is a need to promote awareness, education and importantly, involve as many people as possible in positive actions. Through such activities people better understand, begin to care and know. Once people care, communities of caring people develop and a positive ethic of caring action develops. ✂

## The West Coast Rock Lobster survey cruise

*By Makwela Mapula Salome  
and Boitumelo Chakana*

Fisheries Branch, Department of  
Agriculture, Forestry and Fisheries

West Coast rock lobsters (*Jasus lalandi*) are robust, large crustaceans with a long tail ending in a well-developed tail-fan and long antennae extending from the front of the head. The body or carapace is orange brown with an orange, blue and green tail-fan. The thorax is covered with spines, and the front of the carapace has two tentacles and smaller central projection (rostrum) between the eyes. The west coast rock lobster occurs in the shallow waters from Cape Cross in Namibia to Algoa Bay in South Africa, where it can usually be found on rocky bottoms. They are slow-growing, long lived animals listed on the National Environmental Management Biodiversity Act of 2004, as a threatened and protected species, which means that it is a species of high conservation value or national importance that requires national protection.

The WCRL fishery is managed through an Operational Management Procedure (OMP), which is defined as scientifically evaluated process defining the manner in which the available data on the resource is used to determine the level of control measures to be detailed in fisheries regulations to manage such a resource in terms of sustainable harvesting, rebuilding strategies, etc (<http://olrac.com/index.php?option=com>). The data on the resource available is collected

through operational field research conducted by the Department. Indices such as Catch per Unit Effort (CPUE), Fishery Independent Monitoring Survey (FIMS) and annual assessment of somatic growth rate serves as inputs for the OMP.

### Management Methods

#### 1. CPUE Data:

Catch per unit effort is defined as an indirect measure of the abundance of a target species and a decreasing CPUE indicates overexploitation, while an unchanging CPUE indicates sustainable harvesting.

#### 2. FIMS Data:

FIMS is an approach used to determine the relative abundance of the resources; it also investigates habitat conditions for purposes of learning more about the surrounding and its possible influence on the resource available. FIMS area covers from Olifants River to Cape Hangklip. The survey takes place the same time every year by using commercial vessels fishing with small mesh traps to ensure that all the undersize lobsters are retained in the catch. The survey is repeated during the same time period annually. Data is collected at different stations, in waters between 10m to 200m depth. Data collected includes species, size, sex, and number of individuals per species caught. During data collection onboard, we measure the carapace length (CL), identify sex of each lobster; observe maturity stages of each female. All catches are counted, including the by catch and the sea lice (parasite) present. We also

*Research interns, Mapula and Boitumelo report on their first survey cruise. Despite inclement weather, they were trained on various techniques and methodologies related to WCRL research. From managing seasickness to beholding the magnificent beauty of nature, this research cruise proved to be an unforgettable experience and training opportunity for both students.*



record parameters such as sea conditions, depth and bottom, current present, wind speed and direction, and the presence of clouds. All lobsters are returned back to sea at the same position.

### 3. Somatic Growth:

Pre moult male rock lobsters are tagged on the side dent just below the carapace to avoid injuries which can lead to death. Only males rock lobster with CL ranging from 75 mm to less than 100 mm with no more than two broken limbs as it can result in distorted grow or shrinking, as more energy will be utilized for re-growth of removed limbs or healing the wound. Tagging is also done to trace migration of rock lobsters and to know the growth rate which differs due to habitat productivity and environmental condition. The tagged lobsters are recaptured by fishers and some are retrieved while we conducting research. When we recover tagged lobsters we measured the new CL, recorded data and the new position using GPS coordination. The tags are removed and after we throw the rock lobsters back into water.

### Other Research Projects

#### *Biochemical Analysis of Lobsters*

The operational stations for biochemical sampling include Olifantsbosch and the Knol which is part of Hout bay protected areas. Samples collected from rock lobster are hepatopancreas, gonads and pleopods samples. The colour of each female's gonad is observed and maturity stage is determined. Samples are stored inside the freezer and send to external molecular laboratories for further biochemical analysis on return from the cruise. Samples are studied in laboratory as indices to know the amount of energy these crustaceans stored in different season and studying the maturity stages of females. A whole mass, tail mass, carapace length and sexual maturity of each rock lobster sampled

for biochemical are recorded as part of research.

#### *Rocky Bank Migration Study*

The study area of this project includes five Rocky Bank stations where the first station begins at a depth of <50 m on Rock Bank and the last in a line due south from the first station ends at a depth of 220m. Data is collected the same way as FIMS data except that survey is carried throughout the year. The main objective of this survey is to monitor the abundance and the migration as a result of varying seasons. In winter there is a high catch of lobsters in Rocky bank 3, 4, 5 stations while in summer they migrate to Nearshore in Rocky bank 1 and 2 Stations.

#### **Conclusion**

All the research data collected are used in decision making by the DAFF scientists and rights holders sectors (subsistence, recreational, and commercial fishers). They meet regularly to agree on regulations such as daily catch limit, closed season, fishing sites, fishing gear and protection of berried and soft shelled lobsters during their moulting stages. The data also determine fishing pressure as some regions resources are over harvested, resulting in ban of fishing as a way of giving rock lobsters a chance to recover from depletion. The weather conditions and rough seas cause a great loss of traps which affects the results of research and a bad working environment because it's dangerous to go far off shore on a bad weather. In some cases the traps are soaked for a long-time leading to an inaccurate result. Sea sickness also affects the staff's working capability.

These research projects are on-going and the research team from DAFF (Chief scientist, Mr. Daniel Van Zyl and his crew) conduct this research every month, off the Cape Point



Boitumelo counts and sorts the retrieved lobsters.



Mapula holds a small pyjama catshark found in the bycatch prior to release.

stations which are divided into sections. All the stations are visited at different times of the year. The stations we operated on this year include Dassen Island, Rocky Bank, Olifantsbosch and the Knol. Dassen Island was visited once in May and now we are focusing on the three other stations.

#### **Further reading**

- West Coast Rock Lobster – information from [WWF SASSI seafood database](#).
- OMP: an Operational Management Procedure or (maybe) One More Pipedream? Can one manage fish stocks by computer programs? [OLRAC SPS website](#). ☞





## National Zoological Gardens hosts educators conference

*By Arno Munro*  
Marine and Coastal  
Educators Network

The National Marine and Coastal Educators Network (MCEN) held their 15<sup>th</sup> national conference during 11-16 January 2015 in Pretoria. This was MCEN's first inland conference and was themed: "Interdependence: The relationship between inland and coastal environments". The conference was hosted by MCEN's Gauteng regional representatives at the National Zoological Gardens (NZG).

The conference brought together formal and informal educators from schools, public aquariums, non-profit NGOs, government agencies and research institutions to promote awareness and education of the marine environment. MCEN is a coordinating group of SANCOR and aims to assist marine educators in their activities, facilitate collaboration between educators, help co-ordinate national marine education initiatives and to identify future opportunities for marine education.

The programme consisted of informative excursions, instructive presentations and classroom activities, allowing participants to share ideas, perspectives and resources. Educators were able to exchange lesson plans and activity demonstrations that they present at their own institutions. Here are a few of the highlights from this information-and-action-packed 5-day conference.

Nicci Hoal, Senior Teacher from the Centre for Conservation Education led a river pollution study in the Apies River. Groups collected information on river speed, temperature, fauna and flora. This was

preceded by a skit (suitable for Grade 4-7 learners) where participants role-played the impacts of wetland pollution and presented potential solutions.

Bianca Engel demonstrated the ocean temperature and salinity experiment which is presented at the Two Oceans Aquarium in its SeaFans course, which is a free, introductory course for grade 9 learners interested in pursuing careers in marine science.

In her lesson "Ooey Goey Fish Guts", Curriculum Developer at NZG, Elize Venter, simulated the dissection of stomachs from various marine animals. The stomach contents were analysed and identified. A food chain was drawn based on the stomach contents. The different food chains were used to build a foodweb and a trophic pyramid. This activity is suited for intermediate and senior phase learners.

University of Pretoria researcher, Dr Nico de Bruyn, gave educators a whirlwind tour of research conducted on the Marion Island Marine Mammal Programme, summarizing three decades of research. The programme focused on population ecology of seals and whales. Long term monitoring of these top predators allows scientists to measure the response of these animals to environmental change in the region.

Dr Monica Mwale, researcher at NZG, presented her

research on the systematics and evolution of estuarine and marine fishes. She uses DNA sequence and morphological data to explain phylogenetic relationships of marine fishes of the western Indian Ocean and to understand the patterns and processes of evolutionary change.

Field trips included guided excursions of NZG's facilities and its aquarium, the Cradle of Humankind (Maropeng and Sterkfontein Caves), Walter Sisulu Botanical Gardens, Rietvlei Dam and Nature Reserve as well as the Ditsong Museum of Natural History. The conference provided educators with new ideas to convey concepts in marine science and afforded a great opportunity for networking.

### Acknowledgements

Many thanks to Armstrong Mashakeni and Ulrich Oberprieler of the NZG for the successful organization of this conference. The following organisations are acknowledged for their sponsorships and support in kind: The National Research Foundation (via NZG and SANCOR), Marine Stewardship Council, Department of Agriculture, Forestry and Fisheries, Walter Sisulu Botanical Gardens, Tshwane Nature Reserve and the Plastics Federation. ✂



Photo Credit: DAFF



## Call for papers—special estuaries issue for *South African Journal of Botany*

The *South African Journal of Botany* calls for contributions to a special issue on the Ecology and Biodiversity of South African estuaries. Guest editors are Janine B. Adams and Guy C. Bate (Nelson Mandela Metropolitan University).

### Overview

This special issue will explore the ecology and biodiversity of estuaries which form the interface between marine and freshwater environments and are complex, dynamic and productive ecosystems. Estuaries are heavily utilized and threatened by development, changes in freshwater inflow and resource utilization.

### Suggested topics

This special issue will include original papers on a range of possible topics such as:

- responses of estuarine biota to the abiotic environment,
- microalgae and macrophytes as indicators,
- mangrove and salt marsh ecosystems,
- ecological health and importance of



estuaries,

- biodiversity conservation and management of estuaries.

### Procedure

- Submit papers electronically by 20 April 2015 to the SAJB online website <http://ees.elsevier.com/sajb/default.asp>.
- SI: Estuary must be selected under "Article Type".
- Deadline revised manuscripts : 31 July 2015 Accepted manuscripts will be published online & the print version in January 2016

For queries contact

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## SANCOR Committee Appointment

The SANCOR Steering Committee is pleased to announce the re-appointment of Dr Lara Atkinson as National Forum Steering Committee Representative. Lara is based at SAEON Egagasini Offshore Node and is a well-established marine biodiversity expert. She also has good knowledge of other areas of marine science, including data management. Lara is very passionate about the field and always goes the extra mile. She has served the SANCOR committee well to date and we wish her well in the future. ✉



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