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South African Network for Coastal and Oceanic Research

SANCOR'S CURRENCY AND STRENGTH IS INFORMATION

SANCOR Newsletter

Launch of the African Marine Waste Network

By

Stephane Meintjes

Sustainable Seas Trust

to pollution and waste from ships, boats and oil rigs.

On 25-26 July 2016, Sustainable Seas Trust launched the African Marine Waste Network at Nelson Mandela Bay Metropolitan University in Port Elizabeth. It was an auspicious occasion that was well-attended by national and provincial government departments, municipalities, a broad spectrum of business organizations, several universities and NGOs, representatives from aquaria, clubs and societies, all with a keen interest in meeting the pollution challenges that have been precipitated by people. More than 80% of pollution originates on land, before leaking into the estuaries and seas, so a big focus of discussions was on how we can better manage pollution in our homes, schools, factories, municipalities and harbours. Attention was also given

The workshop on 25 July, attended by 80 delegates, had two specific objectives: to obtain expert recommendations on how best the network could bring people of the 38 coastal and island states of Africa together in a concerted movement to reduce waste and other forms of pollution around Africa, and the second aspect was what should be in the strategy, a guide book, on the types of actions, policies and procedures that are need to transform behaviour of people from all walks of life. Leaders in policy, in education, in networking and management, science, manufacturing, recycling, as well as challenges in municipalities, tourism, harbours and ports to how GIS (Geographic Information System) can be used as a tool to understand the distribution, accumulation and removal of marine waste in Africa, the workshop delved into these and other questions related to setting up a strategy for the Network. All

helped build an outline of the strategy. The goal is to have the strategy ready for international review by June 2017 when Port Elizabeth will host an international waste conference.

Organiser of the event, CEO of the Sustainable Seas Trust, Dr Tony Ribbink said: I was particularly pleased to see the way in which academia, business, government, civil society networked, demonstrating how seriously they are taking the pollution issue. Indeed, we all need to do this; because, frighteningly, our planet is so badly polluted that every breath you take, every drop you drink, every morsel of food you eat anywhere is polluted; in some places so badly polluted it can kill you, in others only traces of pollution are found. The teams working together on Monday gave me confidence that we can turn matters around so that our children's tomorrow will be better than it is today".

The official launch on 25 July saw guest speakers voicing their support for this new project, and indicated how they saw their own role in the network. The interconnectedness of the various sectors in solving the problem of plastic pollution, and waste at large, was clearly enunciated. Speakers included Deputy Vice-Chancellor of NMMU, Mr Andrew Leitch, CEO of the Nelson Mandela Business Chamber, Mr Kevin Hustler and Executive Director of Plastics SA, Mr Anton Hanekom, Mr Andre Share of Operation Phakisa, Councillor Rory Riordan of Nelson Mandela Bay

Municipality, Ms Mandlakazi Skefile, the CEO of Nelson Mandela Bay Tourism and Sakhumzi Somyo, the MEC for Economic Development, Environmental Affairs and Tourism,

Mr Kristian Teleki, the Senior Marine Advisor to the Prince of Wales's International Sustainability Unit gave the keynote address. His talk focused on how valuable plastic is to our society and economies, but he also discussed the massive impact that plastic has on the environment. The purpose of his analysis was to look at ways in which human beings can co-exist with plastic until other alternatives are found. He ended his talk titled "The Plastic Dilemma" by saying: "This is not a blame game. This challenge is on a massive scale and cannot be tackled by one group. It is about dialogue and innovation coming together to tackle major challenges and find new opportunities in material efficiency". He stressed the huge importance of developing the African Marine Waste Network, showing that the problems in Africa are clearly growing and in desperate need of collaboration among countries and pollution and waste know no boundaries.



Mr Kristian Teleki, of the Prince of Wales Foundation.

The official launch of the African Marine Waste Network anchored a programme which has already commenced and will add impetus to a multidisciplinary and cross-boundary offensive which is certain to improve the quality of life of millions of people and which might be a step towards saving our planet and our continent. The project will be run from Port Elizabeth, adding to the growing number of national and international marine initiative that are centred in Nelson Mandela Bay.

To find out more about the African Marine Waste Network and how you can join the network please contact info@sst.org.za or call 076 608 3587.

By working together, we as a country and more importantly as a continent can make a difference! ✂

SEPTEMBER, 17

Mark your calendar for September 17 so that you can be part of the next [International Coastal Cleanup](#).

Seaweeds and echinoderms in the land of King Mabudu

By

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Maputaland, the name given to the coastal plain stretching from the Mozambique border to around St Lucia, was once ruled by the Thonga king, Mabudu, whose territory extended northward to present-day Maputo, in Mozambique. Though his name lives on in the name of that city and the palm-dotted plains of northern KZN, King Mabudu is long gone. Human history may be ephemeral, but the marine life of Maputaland, bathed in the mighty Agulhas Current, has probably remained much the same for millennia - since long before Mabudu avoided conquest by paying tributes to the Zulu king, Shaka.

The marine life of Maputaland remains incompletely known and, like marine life everywhere, it may face a threat greater than any since the last of the Pleistocene ice ages: Climate Change. This little-

understood threat requires that we document what is here now, so that we will know when changes are happening. As part of that documentation process, we have been interested in Maputaland for almost two decades.

In 1999-2003, Belgian and NRF funding brought together phycologists and echinoderm specialists to sample along most of the coast of KwaZulu-Natal. The project increased the known biodiversity of seaweeds and echinoderms of KZN by 30% (Bolton *et al.* 2003), and produced a 293-page

“Guide to the Seaweeds of KwaZulu-Natal” and many other publications on seaweeds and echinoderms, two unrelated groups of organisms that often share the inshore zone. However, since then molecular methods have become essential to systematic studies, and much of the material that was collected back then is unsuitable for DNA sequencing. The need for better samples for molecular systematics, as well as concern about climate change, prompted our Belgian colleagues to plan and find funding for another project, this time focussed on Maputaland.



The Manzengwenya team. Top row L to R: Janko Fourie (Triton), Zoleka Filander (DEA), John Bolton (UCT), Erich Koch (UCT), Neville Ayliffe (Triton), Olivier De Clerck (Belgium), Grant Brockbank (Triton), Chris Boothroyd (DAFF), Jennifer Olbers (EKZN Wildlife). Bottom row L to R: Didier vandenSpiegel (Belgium), Rob Anderson (DAFF), Brigitte Segers (Belgium), Yves Samyn (Belgium), Mark Rothman (DAFF), Zakhele Zakhile (Triton). Absent: Eve Marshall (Triton).

Most of the Maputaland coast falls within the iSimangaliso Wetland Park, and this protection makes it particularly useful for scientific studies. Also, the Maputaland coast occupies a particularly interesting biogeographic position. It is the only tropical part of the coast of South Africa, falling within the Indo-West Pacific Biogeographic Realm (*sensu* Spalding *et al.* 2007) and containing the most southerly (highest-latitude) coral reefs in that Realm. The seaweed flora of Maputaland is overwhelmingly tropical in affinity, but also contains warm-temperate elements from the central and southern KZN coast to the south (Bolton *et al.* 2004).

Like the seaweeds, the echinoderms of Maputaland have tropical and warm temperate affinities. The Indo-West Pacific echinoderms in South Africa is the second largest faunistic component with over 37% of South Africa’s echinoderm fauna being on the east coast (Thandar 1989). Maputaland holds an interesting fauna where new species to South Africa are commonly found. Olbers *et al* (2015) and Filander and Griffiths (2014) recently recorded an additional 29 new species to the South African fauna for the brittle stars and urchins from Maputaland alone!

The new Maputaland echinoderm/seaweed project had three main aims. The first was to collect voucher specimens and DNA samples of

as many species as possible. The second was to see if there had been any change in the composition of these organisms in the decade and a half since the first trip. The third aim was to run a short workshop at UKZN that would teach some echinoderm and seaweeds systematics to interested students and professionals.

Dives and shore collections were done from two bases. The first was Triton Diving in Sodwana Bay, from which collections covered the southern Maputaland area from Leadsman Shoal in the south to north of Nine-Mile Reef. Here the expedition enjoyed the customary excellent services provided by Eve Marshall and the Triton team, and had the pleasure of using their new lab ([see separate article](#)). We were reminded of the important differences between collecting seaweeds and echinoderms. Seaweed collectors can move fairly quickly over a reef, picking any interesting specimens (the term for us at Triton is “Flower Pickers”). Echinoderms hide (they are mostly nocturnal) and echinoderm collectors



Didier vandenSpiegel contemplates the day’s echinoderm samples.

(otherwise known as “Echinoworms”) have to turn over loose rubble and investigate nasty cavities in the reef that could be home to moray eels or stonefish.

Once collected, seaweeds are



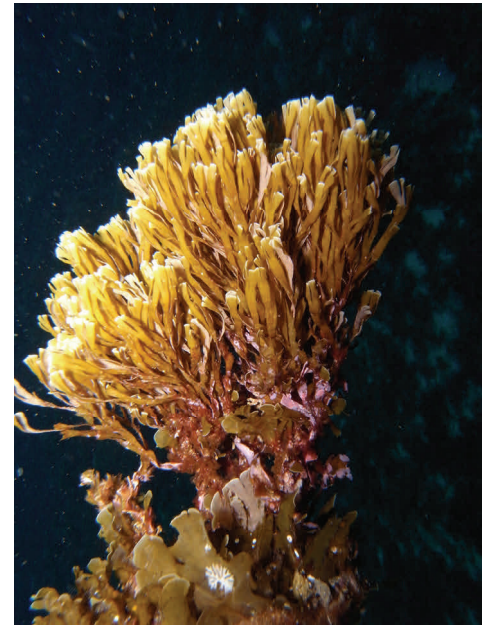
A graceful ballet of Flower Pickers searching a Maputaland reef for seaweeds.

immediately sampled for DNA (tissue clips placed in silica gel) and vouchers specimens are pressed. Echinoderms are trickier. Most have to be relaxed in a solution of magnesium chloride or freshwater for several hours. Without that treatment, sea cucumbers expel their viscera and the delicate feather stars and brittle stars crunch up tightly and become taxonomically useless. Echinoderms are fixed in alcohol and eventually either stored in alcohol or left to dry (often where the smell offends passing phycologists!).

Our second base was Manzengwenya, only about 30 km north of Sodwana as the hornbill flies, but effectively much closer by boat to the northern Maputaland reefs. There we stayed in the spacious Ezemvelo KZN Wildlife research house that stands under a grove of Casuarina trees, about 1 km from the beach. From here Triton took us to various localities as far north as Saxon Reef, near Kosi Mouth. The diving was once again excellent, although the tides meant that we usually had to wake up very early to launch. The collections continued to grow.

During one day of strong southerlies, diving was impossible and so we set off in our 4X4's to do some shore collecting. A maze of sandy bush roads criss-crosses much of the coastal plain north of Sodwana, so our search for the headland

called Black Rock took us a little too far north, to Dog Point. This is a typical Maputaland coastal feature, similar to Jesser Point at Sodwana - a low, beach-rock point that creates a small bay on its northern side, where one can snorkel at low tide over bits of shallow reef. There we found a number of shallow-water and intertidal species that we had not found during SCUBA diving, including a few that caused excitement among the Flower Pickers during the afternoon's sorting. The finds prompted another shore trip, a few days later, to snorkel in the lovely little bay at Lala Nek, and this was also very productive. After almost a week at Manzengwenya we returned to the Triton lodge at Sodwana to re-organise,



Lobophora dichotoma, the cause of some excitement. This rare species, known only from Maputaland (type locality) and southern Madagascar, has strap-like fronds that are completely atypical of *Lobophora*, and was recently shown to be part of the most basal lineage in the genus.



Launching at Manzengwenya. Divers don life-vests as Triton skipper Grant Brockbank prepares for the run through the breaker line.



Afternoons at Manzengwenya: time for sorting and processing samples on the veranda.

do some final sorting and to plan for the forthcoming workshop.

The last four days were spent in Durban. Two days were devoted to finalising workshop plans, collecting fresh seaweeds and preparing the lab at the University of KwaZulu-Natal in Westville. Our host there was Prof. Ahmed Thandar, who, although retired, is still very active in sea-cucumber research. The workshop was attended by about 20 professionals and students from various institutions. The morning presentations covered a range of topics, some of which were relevant to both seaweeds and echinoderms: nomenclature, species-concepts, biogeography, etc. The afternoons were mainly “hands-on” sessions, spent learning the basics of identifying the organisms. The response was good, with lots of discussion, and we were left feeling that it had been very

worthwhile.

Voucher specimens of the taxa will remain in South Africa, the seaweeds in the Bolus Herbarium at UCT, and most of the echinoderms at Iziko SA Museum. A lot of work remains to be done. DNA samples must be analysed and unidentified taxa sent out to experts. Have there been any changes in the seaweeds or echinoderms in the last 16 years? Our first impression was that the seaweed species look much the same. Although 11 echinoderm species were recorded that are new to South Africa, Yves Samyn, leader of the echinoderm team, felt that there were fewer animals around than previously. However, these impressions need to be confirmed once more work has been done on the samples.

Whatever the final results, there are now good “baseline” specimens for many of the species. The DNA samples will allow not only better taxonomic identifications, but improved higher-level systematic studies of the seaweeds and echinoderms of Maputaland, and their relationships to taxa from other parts of the world. Finally, detailed records from various sites along the Maputaland coast bring us closer to having the “canary in the coalmine” that might detect any climate changes as they begin to happen.

Acknowledgments

We gratefully acknowledge funding from the King Leopold III Fund for Nature Conservation, the Royal Belgian Institute of Natural Sciences, the National Research Foundation (SA), NRF, UCT, DEA and DAFF.

For superb diving support we thank the staff of Triton Dive Charters, especially Eve Marshall, Grant Brockbank, Zakhele Zikhali, Ine Smith and Janco Fourie. Rocktail Bay dive camp are thanked for assisting in launching from Manzengwenya.

We thank Ezemvelo KZN Wildlife for providing accommodation at Manzengwenya and the University of KwaZulu-Natal (Westville) for hosting the workshop. We thank the following authorities for research permits: iSimangaliso Wetland Park Authority, Department of Environmental Affairs and the Department of Agriculture, Forestry and Fisheries.

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Triton Diving, Sodwana Bay

By
Rob Anderson
DAFF / UCT

After the long, hot drive from Durban via Hluhluwe, it is always a pleasure to take the turnoff to Triton Dive Lodge, a few km outside the small town of Mbazwana, near Sodwana Bay. You pull up under the tall trees outside the reception office, and begin another research-diving trip in Maputaland, with its warm, clear water. A tough job, but someone has to do it...

We've been doing periodic seaweed research in Maputaland for almost two decades. Our recent seaweed/echinoderm expedition with Belgian colleagues ([see separate article](#)) prompted many happy reminiscences linked with Triton, and so an article on this rather remarkable diving operation seemed appropriate.

Triton started in 1996 when Peter Timm, a Free Stater by birth,

gave up being an electrician to begin a life close to the warm seas of Maputaland, where he could follow his diver's dream. He subsequently built up Triton to become the foremost dive charter in the area for scientists and serious naturalists. Tragically, Peter died in 2014, off the KZN south coast, while trying to save another diver, but his dream lives on under the very competent management of Eve Marshall, herself a renowned underwater photographer and diving instructor.

For the scientist, Triton is a very special dive lodge, because their passion for marine life extends beyond just diving, to going out of their way to support research. And they have an enviable



Outside Triton's new lab. John Bolton picks through a bucket of seaweeds while Jennifer Olbers sorts out some echinoderms.

reputation for diving and diver training. They have been teaching SCUBA and trimix diving since 1996, and on the 17th January 1992 Peter Timm and his co-divers, advanced trimix students, were the first humans ever to see a live coelacanth underwater, in its deep-water habitat. This historic dive produced photos of “old four-legs” at about 128 m depth, in a canyon off Sodwana Bay. Since then Triton have hosted several international expeditions to film these 350-million-year-old “living fossils” in the canyons off Maputaland.

While coelacanths put Sodwana Bay in the headlines (and brought funding to marine science on that coast!), they are only a small part of the operations that Triton has hosted over the years. There is hardly a taxonomic group of marine life that has not been photographed or measured by scientists operating off

Triton’s inflatables or working from their lodge. Fish, corals, turtles, seaweeds, bryozoans, echinoderms, crustaceans –pretty much everything in the food chain! The institutions whose scientists use Triton make up an impressive list of acronyms: SANBI, DAFF, DEA, UCT, NMMU, UKZN, SAIAB, Rhodes, etc. Triton are permitted to dive below 60m and work with scientists within remote sanctuary areas, for which they feel very privileged.

Triton has all the amenities you’d expect of a dive lodge: cabins, fully fitted self-catering cottages, a large communal braai area, pub, swimming pool etc. They operate with two 8.5 metre inflatables, and Eve and her very competent staff know the Maputaland dive spots like few others, so that specialists are guaranteed quick access

to their organisms.

The latest addition to the amenities at Triton is a laboratory, something Peter Timm and Eve Marshall dreamed of years



Interior of the Triton lab. Mark Rothman (front) presses seaweeds selected by Olivier De Clerck, while in the computer/microscope room (background) John Bolton examines specimens.



The Belgian echinoderm team at work in the Triton lab. Didier vandenSpiegel (right) and Yves Samyn sort through specimens on the centre bench, while Brigitte Segers(back to camera) processes samples.



Eve Marshall finalises preparations for a beach-launch with Janko Fourie (Dive master) while the rest of the Triton team load diving equipment on the boat.

ago. After Peter's death, Eve decided that this would be a very fitting tribute to Peter, whose passion to understand and protect marine life grew with the passing years. With some financial help from donors (scientists, divers and friends), the "Peter Timm" laboratory was completed in October 2014.

On field trips and expeditions, many hours can be spent sorting and processing samples. Triton have always done their best to provide visiting scientists with a comfortable place to do that, but the lab makes it a pleasure. It has a wide central bench and benches along the inside walls under the windows. There is a small storeroom at one end and a computer room at the other. A few microscopes have been donated, but essentially, research groups need to bring their own equipment.

While the new lab stands as a direct tribute to the late Peter Timm, perhaps his spirit is best honoured by the role that Triton Diving continues to play in marine research in Maputaland.

Triton can be contacted at tritondiving@mweb.co.za and their web address is www.tritondiving.co.za ☞

In memory of Dr Allan Connell

By

Steven Weerts

*Coastal Systems,
CSIR Natural Resources and
Environment*

It is with great sadness that we mourn the death of Dr Allan Connell who passed away during a dive on Friday 18th March 2016.

Allan worked at the CSIR for some 35 years during which time he was a leader, a mentor and friend to his colleagues and a countless number of younger researchers. Our memories of him, affectionately nicknamed "MacGyver" because he could make anything from almost nothing, will remain vivid. Allan retired 12 years ago but remained in regular contact with the Coastal Systems Group. He always made himself and his knowledge available and gladly came into the laboratories to assist students with larval fish identifications. Throughout his career he took great satisfaction in learning about all things related to the sea, and in sharing his knowledge and his love of it and its creatures. He was a true naturalist and merged his personal life, passion and work as a marine scientist.

After retirement from CSIR Allan remained active as an Honorary



Research Associate of the South African Institute for Aquatic Biodiversity and focussed on his long term research of marine fish eggs and larvae, work that began in the mid-1980s. He was an early adopter of DNA testing technologies as a means of identifying eggs and larvae and became the South African representative on an international project to barcode the fishes of the world. His work in this field was pioneering and while his knowledge is irreplaceable he leaves a legacy for us and the next generation of scientists, as well as all those who love the sea.

We will miss him dearly and our heartfelt sympathies go out to Dawn, Garth and Tracey. The one small consolation that we have is that he died doing something he loved. In the words of Mike Fraser, his long-time dive buddy, "Fin on my mate, past the timeless reefs where new specimens lurk in every crevice". ☞

Between the seals and the deep blue sea: what models tell us about penguin conservation

By

Florian Weller

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The African penguins (*Spheniscus demersus*) living on South Africa's coast have had a hard time of it for the last few decades. While there were about 56 000 breeding pairs in 2001, that number had shrunk to about 17 000 by 2013. The losses appear to be ongoing at most colonies, and have been more pronounced in some locations than in others; for example, numbers breeding at Dyer Island (once the largest colony of all) dropped from 22 655 pairs in 1979 to below 1 200 pairs in 2015. In 2010, the African penguin was officially classified as Endangered. The urgent need to stop and eventually reverse its decline has been recognized for some time, and is the subject of a [national biodiversity management plan](#).

However, the forces behind the penguin colony collapse are still far from clear. Several historic practices are obvious culprits – among these are the almost complete removal of the guano layers in



A group of African penguins comes ashore on Dassen Island. The colony has been shrinking for decades.

which penguins habitually dug their nests, and the collection of penguin eggs. It is generally accepted that food shortages, attributed to shifts in fish stock distributions and possibly also to past fishery exploitation of small pelagic fish, are a major factor in more recent times. Yet there appears to be much variety in what causes the continued shrinkage of colonies and/or prevents them from recovering. Much of the difficulty in understanding what is happening at any given colony is in that the environmental conditions faced by penguins may be very different from location to location. For example,

almost all nesting sites on Dassen Island are either underground or protected under vegetation, while on Dyer Island 80% of nests are out in the open and thus more vulnerable to rain flooding, overheating or unwanted attention from gulls. Mainland colonies like Stony Point may suffer from predation by caracals or feral cats, while many island colonies are free of land-based predators. And there are substantial differences in how many food fish are available around colonies over the year, and consequently, in how far penguins have to swim to feed their nestlings or to fatten up for breeding and moulting.

A simulation model has been developed by the Penguin Pressure Model Working Group (with participants from UCT, DAFF, Cape Nature and BirdLife) to simulate the situation at individual colonies and figure out which pressures have the highest impact at specific locations, and where management efforts should thus be concentrated. Models have so far been constructed for the colonies at Robben Island and Dyer Island. Both of these are formerly large populations that have crashed in recent times, and both islands are the subject of ongoing penguin monitoring projects that have yielded the type of long data series necessary for modeling.

The [two studies](#) again confirmed that food availability, in the form of sardine and anchovy abundance, is of fundamental importance in how well

African penguin colonies are doing. Annual biomass surveys of these fish in the wider Benguela system appear to be the best overall predictor of the survival rate of adult and juvenile penguins. Fish availability close to the colony is more important for the well-being of eggs and chicks while they are being cared for by parents who are restricted from travelling too far afield during that time. For Robben Island, the model suggests that improving this breeding season food situation by implementing multi-year fishing restrictions in the island's vicinity might help towards possible recovery of the colony. Such fishing closures have already been trialled there and at other colonies and are still being evaluated. Another constant pressure is low-level oiling, a common occurrence in Table Bay, where small amounts of oil frequently enter the water from sunken

wrecks or illegal dumping. While most oiled penguins are successfully rehabilitated by SANCCOB, it has been shown that they are likely to suffer from diminished breeding success for the rest of their life. The model identified further mitigation of small-scale oiling as one of the top penguin-related management priorities on Robben Island.

Model results for Dyer Island strikingly demonstrate how different circumstances may be at individual colonies. The simulations indicated that the fishing closures, which might work to good effect on Robben Island, would currently be of almost no value here. The reason for this appears to be that the Dyer Island penguins are heavily impacted by a pair of pressures not found on Robben Island. The first of these is predation by fur seals. Since there is a sizeable fur seal colony on the



A young penguin chick is being weighed and measured. The health of chicks is one of the factors that allows estimating a colony's breeding success.



The fur seal colony on Dyer Island is flourishing, but some management may be necessary to allow seals and penguins to coexist there.

island, there is always a certain number of young male seals around who enjoy hunting penguins in the water. As this is mostly a play behaviour (and penguins apparently are hard to catch), the number of victims is relatively low, amounting to 7-8% of adults each year. However, the loss of a breeding adult has a big impact in species like the African penguin, where adults start breeding late in life (at age 4–6) but may continue to do so for a long time; it is far less troublesome for a penguin population to lose several nests full of nestlings, than to lose one breeding adult. Consequently, the simulation indicated that under current circumstances, seal predation alone could halve the penguin colony over 20 years. Perhaps more important, this ongoing predation pressure prevented the simulated colony from being able to make use of other improvements to its situation – the enhanced survival derived from a better food supply, for example, just didn't matter much in the presence of seal-related mortality.

A second obstacle in the way of the Dyer Island penguins' recovery is a high emigration rate of juveniles. A large number of young penguins (certainly more than 50%) leave the colony after moulting for the first time and do not return for breeding, instead choosing to nest at other colonies. The most likely

cause is poor feeding around the island – having been hungry here, the juvenile penguins go elsewhere for the strenuous business of raising their own chicks. For the development of the colony, this has a very similar effect to seal predation in that it hurts the colony's reproductive power so that the population is unable to grow. Together, seal predation and juvenile emigration appear to double-barrel to keep the Dyer Island colony in its current state of ongoing decline. But if both issues were alleviated, the simulations show that fishing closures might become useful, as at Robben Island.

These model results thus suggest that penguin conservation management at Robben Island should focus on improving the availability of food fish, possibly through the use of fishing restrictions in the island's vicinity; while at Dyer Island, this approach ought to be combined with efforts to prevent seals from preying on penguins, by targeted removal of problem seals. Since it is only ever a few seals who take up this sport, and previous control attempts show that seals are generally smart enough to take the hint when they see a human with a gun out on the water, this might be quite feasible. Hopefully, such management efforts can be implemented in time before the colonies dwindle even further. ↻

TWAS Fellowships for Research and Advanced Training

TWAS offers fellowships to young scientists in developing countries to enable them to spend three to 12 months at a research institution in a developing country other than their own. The purpose of these fellowships is to enhance the research capacity of promising scientists, especially those at the beginning of their research career, helping them to foster links for further collaboration.

Closing date for applications:

1 October 2016

[Click here](#) for the latest information on the programme.

The logo for TWAS (The World Academy of Sciences) features the word "twas" in a stylized, lowercase, blue font. The letters are connected, with the 't' and 'w' being particularly prominent.

South Africa to take over as Chair of Indian Ocean Rim Association (IORA) in 2017

By

¹Narnia Bohler-Muller,
²Juliet Hermes and
²Nicole du Plessis

¹Human Sciences Research
Council

²South African
Environmental Observation
Network

The Indian Ocean Rim Association (IORA), of which SA is a founding member, was formally launched by a Ministerial Meeting in Mauritius in March 1997. The Association's broad objective is to promote the sustained growth and balanced development of the Region and of the Member States, and to create common ground for Regional Economic Co-operation.

There are 3 arms within IORA, the AG (Academic Group, the focus here); Trade and Industry and the business forum. These groups report to the Meeting of Senior Officials who then advise the Ministerial delegation. IORA has adopted the following priority areas:

- Maritime Safety and Security,
- Trade and Investment Facilitation,
- Fisheries Management,
- Disaster and Risk Management,
- Academic cooperation, Science and Technology, and



The SA delegation at the 3rd Indian Ocean Dialogue, "Addressing Maritime Security Challenges in the Indian Ocean through Enhanced Regionalism", held from the 12th to 15th April in Padang, Indonesia, from left: Dr Juliet Hermes (SAEON and SA IORA-AG Vice Chair); Aditi Lalbahadur (SAIIA); Mr KGame Molope (DIRCO); and Prof Narnia Bohler-Muller (HSRC and SA IORA-AG Chair).

- Tourism and Cultural Exchanges

Cross cutting issues include women's empowerment and the Blue economy.

Currently SA serves on the IORA-AG as the Vice Chair to Indonesia (with

Australia as the outgoing Chair) until October 2017 when SA will take over as Chair until 2019 with the United Arab Emirates as the Vice Chair.

Preliminary priorities for South Africa's Chairship will potentially include the following (although the final priorities

will be determined in 2017):

- The Ocean or Blue Economy;
- Research Development and Innovation;
- The engagement with Dialogue Partners;
- Maritime Security;
- The advancement of the African Maritime Agenda and,
- The participation of civil society in IORA.

Women's economic empowerment will remain as a cross cutting theme.

To help realise these priorities SA has established the IORA South African Academic Chapter which is intended to serve as an advisory body to guide South Africa as Vice Chair and later as Chair. The South African Academic Chapter will also assist the South African government in consolidating multilateral engagements that relate to topics covered under IORA and associated areas; post the IORA chair.

The South African Chapter is established in accordance with the objectives of the Indian Ocean Rim Academic Group, which constitutes the academic arm of IORA, with the view of underpinning policy formulation, design, development and implementation with research in the IORA context.

There are currently a number of sub-themes for discussion within the IORA AG, these are:

- Ecosystem, biodiversity and biodiscovery;
- Environment and global change;
- Renewable energy;
- Estuarine, coastal and marine resources, society and development;
- Fisheries and aquaculture ;
- Geo-strategic issues and non-traditional security threats.

There are also the cross-cutting themes of:

- Operation Phakisa and Blue economy;
- Transformation;
- Science, Technology, Innovation and capacity development.

South Africa has appointed Prof Narnia Bohler-Muller (HSRC) as the Chairperson for the South African Chapter of the Academic Group (and hence Vice-chair of the IORA Academic Group and will take over as Chair in 2017) and Dr Juliet Hermes (SAEON) as the Vice-chair. The Chair will coordinate the group's activities aimed at achieving the outlined priorities.

Formal communications will be sent out via the SANCOR mailing list, but for any further information please contact nbohlermuller@hsrc.ac.za or juliet@saeon.ac.za or please see: <http://www.iora.net>



MSc Opportunity in Physical Oceanography ACEP IV

We are looking for a quantitative, self-motivated, dedicated student to work up historical physical oceanographic data in the KwaZulu-Natal region. The student will also have an interest in applying oceanographic information to support marine protected areas. The main focus of the project is to assess all available historical data and that which will be collected over the next two years and determine a mean state for the KZN Bight in order to assist with MPA decision making processes currently underway for the region.

Interested? – Please contact tammy@saeon.ac.za or juliet@saeon.ac.za for further information.

SADSTIA and WWF-SA team up for Fishery Conservation Project

By
Claire Attwood
Media Consultant

A new collaboration between the South African Deep Sea Trawling Industry Association (SADSTIA) and WWF South Africa (WWF-SA) will dramatically improve the management of non-target species, like angelfish, panga and jacobever, and ultimately improve their sustainability status on the Southern African Sustainable Seafood Initiative (WWF-SASSI) list.

Since 2004, when hake from the South African trawl fishery was first certified as sustainable and well managed by the Marine Stewardship Council (MSC), SADSTIA members have worked steadily and systematically to improve the environmental performance the fishery, going far beyond the conditions of certification. Yet, in spite of the strides that SADSTIA has taken to “green” the trawl fishery, and the fact that its hake was certified by the MSC for a third five-year period in 2015, the association is concerned that a number of fish that are caught in trawl nets alongside hake – collectively referred to as non-target species or trawl by-catch – are rated “orange” or “red” on the SASSI list.



Fish workers, Dylin Cupido and Mzolisi Kali, prepare a consignment of horse mackerel for the market. Horse mackerel and other non-target species caught in the deep-sea trawl fishery, are valued as a source of good quality animal protein by lower income groups and as such play a role in food security, particularly in the Western Cape. Photo courtesy of I&J.

WWF-SASSI’s traffic light system classifies seafood species into colour-coded lists: green indicates that fishing for the species is sustainable, orange advises a measure of caution because there may be some sustainability concerns, and red indicates there are serious concerns about the ecological sustainability associated with the fishing of a species.

Currently, 13 species that are landed by the deep-sea trawl fishery are categorised by WWF-SASSI. Six of the 13 species are on WWF-SASSI’s green list: gurnard, snoek, monk, angelfish and the two hake species (which are MSC-certified); five are on the orange

list (Cape [John] dory, panga, octopus, kingklip and horse mackerel); and two are on the red list (jacobever and biscuit skate).

Until now, the management of non-target species in the deep-sea trawl fishery has been at best highly selective and at worst, non-existent. While catches of kingklip and monk are closely monitored and managed by precautionary upper catch limits and “move-on” rules (that require fishing vessels to move away from trawl grounds when catches of either species climb above a set proportion of the total catch) there are few rules governing the majority of non-target species. And,

although catch records are kept, they tend to be inaccurate; space is at a premium in an on-board fish factory and so a range of different bycatch species might be stored and tallied together.

As Jessica Greenstone, marine science and policy lead at WWF-SA, explains, in some cases it is the sheer lack of information about a species that is responsible for its orange or red listing:

“We are charged with giving an overall view of how much the (hake) fishery is impacting other species and the environment and we couldn’t give some of the by-catch species a positive score because we didn’t have the data. Under the SASSI methodology a species won’t score well if there’s a lack of information,” she says.

One of the reasons for the apparent neglect of by-catch species is that the Cape hakes (deep water and shallow water hake) have been, and continue to be, the firm focus of trawler operators. Some are locked into supply agreements with international customers and so the need to optimise hake catches and meet supply commitments is paramount; others try to optimise hake catches simply because there is such strong demand for hake. Another reason is that the Department of Agriculture, Forestry and Fisheries (DAFF) and its Demersal Scientific Working Group (DSWG) are geared towards the assessment and management of the target species. In order to retain the valuable MSC

accreditation DAFF is required to tick a number of scientific and administrative boxes, among them the successful completion of stock assessment surveys and the running of a scientific observer programme. With DAFF’s limited resources, it’s no wonder that, until now, there has been limited scope to pay attention to the other fishes that are landed by the deep-sea trawl fishery.

The Fishery Conservation Project

In April, SADSTIA and WWF-SA agreed to co-fund and co-manage a three-year South African Offshore Trawl Bycatch Fishery Conservation Project to support DAFF’s management of the fishery and to “undertake research, implement practical actions, and generally improve the environmental performance and sustainability of the fishing activity of SADSTIA’s members, with a particular focus on non-target species management”.

Although the objective of the project is to fundamentally improve the data collection and management of non-target species in the deep-sea trawl fishery, an intended spin-off for SADSTIA is that certain species will move off the red or orange list and towards the SASSI green list.

As Tim Reddell, chairman of SADSTIA and director of Viking Fishing explains, improved SASSI ratings will substantially enhance the image of

SADSTIA which has done so much to improve its environmental footprint.

“This latest partnership with WWF-SA is another important step towards improving the environmental footprint of the fishery. We have to pay attention to these by-catch species and improve their management,” he says.

Replacement yield analyses are planned

Eight activities are planned for the FCP which is to be rolled out over three years. One of the most challenging activities is an initiative by the DAFF DSWG to conduct stock assessments for the top 15 non-target species in the fishery. Seven species will be prioritised.

The term “stock assessment” is used loosely because conventional stock assessments require precise estimates of catch and abundance and the data available for the non-target species fall far short of meeting that requirement. As a result, a coarser approach – a replacement yield analysis – is to be applied. Such an analysis is capable of estimating the size of the catch that will maintain the stock at its present level of abundance (called the “replacement yield”) but is unable to indicate whether this abundance is above or below that which can provide the maximum sustainable yield, and therefore whether, or to what extent, one might wish to see the stock recover.

However, in spite of the shortcomings of the replacement yield approach, the

move by the DSWG to assess these species is a very important step, says Greenstone.

“For species like ribbonfish, for example, annual catches are more than 4 000 tonnes, but there has been no assessment to determine whether that catch is sustainable or whether the species can withstand that kind of fishing pressure,” she explains. “The industry has been very supportive about the move to collect data on these species.”

Industry involvement is critical

In fact, the industry will play a pivotal role in the FCP and to some extent the success of the project will come down to the ability of skippers and fishing crews to adapt to new on-board routines and practises. The goal is to ensure there is better recording at drag level and that catches are sorted and accurately tallied in the fish hold.

“We are asking them to sort the fish exactly, so that we can get very accurate information about how much of each species is caught,” says Greenstone.

Such information will help the DSWG to extract accurate catch per unit effort (CPUE) data for each of the top 15 non-target species.

Fisheries observers will also play an important role. For the past 16 years, deep-sea trawlers have carried on-board observers who take basic biological

samples and measurements of the hake. Although observer coverage has fluctuated over the years according to the availability of funding, the observer programme is recognised as an important component of the management of the deep-sea trawl fishery and its maintenance has become a requirement of MSC certification. One of the objectives of the FCP is to broaden the mandate of observers so that they collect information about hake, as well as the common by-catch species.

Also included on the FCP “to do” list are a stakeholder analysis, a report on the socio-economic impacts of the fishery, a guiding document that sets out the EAF objectives for the fishery (similar to an EAF management plan) and the establishment of a traceability protocol. Such a protocol will allow the industry to trace, for example, a snoek or panga sold at a spaza shop, back to the vessel that caught it. Such a protocol is already in place for hake and its extension to popular by-catch species will ultimately help consumers to make sustainable choices.

As Greenstone puts it, “you want consumers to purchase products because they are sustainable, but their intent is thwarted if there is co-mingling of sustainably harvested product with product that was not sustainably managed. That’s why the traceability protocol is necessary.”

At the close of the three-year FCP, it is expected that at least six of the 12 non-target species will have improved their status on the SASSI list, some will move onto the green list, and the DAFF will have in place basic assessment and management procedures for 15 species.

For more information about the FCP, please visit the SADSTIA website: www.sadstia.co.za/news/latestnews



What can micro-blogging tell us about marine science? A Twitter hashtag crawl analysis

By

Rita Adele Steyn

*South African Environmental
Observation Network*

What do social media, science, and communication have in common? Allow me to begin with full disclosure – if you read any further I have successfully tricked convinced you to read another article about science communication, hereafter referred to as scicomm, and social media. Why? Because I think that you don't know yet what SNA (Social Network Analysis) can do for you, what it can teach us about scicomm, and why you should be tweeting about your science (I recommend this article, '[Why I Tweet](#)', by Manu Saunders).

The last decade has seen an exponential rise in the use of information as currency (think big data) and an explosion of social media networks. These merely represent new tools in the ways that people, and scientists (who are people too!) communicate with each other and with the world. In fact, the journal *Public Understanding of Science* will soon be celebrating 25 years of publishing scholarly articles about how the public views, understands, and accesses scientific information.

These interactions of science and the public become increasingly blurred on social media sites where there is no requirement of peer review before publishing. However, it is in these spaces that scientists CAN thrive, bridging gaps of understanding through engagement, and improving access to scientific information and findings.

Effective use of these networks requires time and effort, and we are beginning to enter the realm where even large funding agencies examine the reach of outreach, or in other words, how far scientific knowledge is spread in the accessible public knowledge sphere, how effectively it is communicated, but also, how effective researchers are at captivating public audiences. This sometimes puts unnecessary pressure on scientists to make science provocative, but it should really be viewed as a way for researchers to explain the importance of their work. All of us suffer from intense demands on our time, but one can still

Academics need to embrace new ways of writing and sharing research –
Craig Blewett

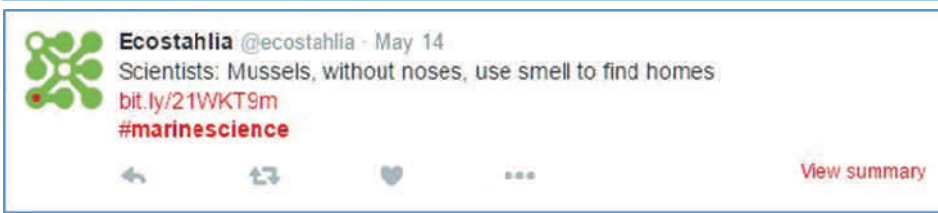
communicate with a large audience using micro-blogging, which is fast, easy, and cheap.

Micro-blogging

The term micro-blogging is used to describe the amount of information conveyed by the 140-character limit of Twitter. This character limit can be hard to manage at first but as you use it, it becomes increasingly easy to share and engage with peers and the public very quickly and easily, and without what some may view as an overwhelming amount of information. Twitter is also free, open, social media. There is no limit to who you can direct your tweets to, and Twitter also includes a suite of analytical tools that one can use to assess and search social media terms.

HASHTAG

A word or phrase preceded by a hash sign (#), used on social media sites such as Twitter to identify messages or posts on a specific topic (online definition provided by Google.com).



An example of the use of the hashtag #marinescience.

Twitter (or Facebook, or Instagram, or even Google) will collect all the posts tagged with a specific hashtag using a search engine algorithm. You can then use this search to extract data about who is using the hashtag, what information they are tagging with it, and who is reading the tagged information. It is helpful that there are open-source programs available to take that analysis to the next level, and the data provides more information and insight than you may have thought a collection of Twitter hashtags could.

The information crawl

Analysis of social media hashtags requires the use of analysis and visualisation programs, two of which are NodeXL (<http://nodexl.codeplex.com/>) and/or Gephi (<https://gephi.org/>). There are many different programs to choose from, and I chose these two based partially on the fact that they are both open-source and freely available for download, and because there are numerous tutorials about the use of these programs. I found them to be fairly user-friendly but still complex enough to have me pounding my keyboard in frustration as I tried to navigate their

multiple possibilities. But that’s not important - on to the fun stuff – what did I search and what did I learn?

#marinescience OR #marinebiology

These two hashtags are the search terms I entered into the NodeXL framework for analysis. NodeXL will send its very clever search bot (algorithm) out to the Twitter network and perform a crawl, or a search-and-retrieval, of all the tweets in the last week that contain the hashtags specified.

I performed the crawl online on May 13 within the social media platform Twitter. NodeXL is built on an excel base, and so extracted information is provided in tabbed sheets. Here you see the overall metric of the hashtag analysis, which tells us that in the week preceding, and including, the day of the search, 222 unique accounts (called vertices)

tweeted about either #marinescience or #marinebiology.

Two hundred and twenty two accounts. Out of 310 MILLION active monthly accounts on Twitter only 222 were tweeting about marine science or marine biology! That doesn’t even qualify as a percentage point!

What do the metrics tell us?

The metrics tell us that of these 222 vertices (sometimes called nodes), there were 280 total edges, or links, between those vertices, but that about half of them were self-loops, or one time

1	Graph Metric	Value
2	Graph Type	Directed
3		
4	Vertices	222
5		
6	Unique Edges	216
7	Edges With Duplicates	64
8	Total Edges	280
9		
10	Self-Loops	124
11		
12	Reciprocated Vertex Pair Ratio	0.048611111
13	Reciprocated Edge Ratio	0.092715232
14		
15	Connected Components	108
16	Single-Vertex Connected Components	60
17	Maximum Vertices in a Connected Component	33
18	Maximum Edges in a Connected Component	47
19		
20	Maximum Geodesic Distance (Diameter)	6
21	Average Geodesic Distance	2.318966
22		
23	Graph Density	0.003077738
24	Modularity	Not Applicable
25		
26	NodeXL Version	1.0.1.350

The NodeXL hashtag analysis shows that in one week 222 unique accounts (called vertices) tweeted about either #marinescience or #marinebiology.

connections that didn't expand the network connecting the vertices. Having fewer edges than vertices means that *there are more accounts talking about #marinescience than there are connections between those accounts.* This is an important point and should not be overlooked, because it tells us that we are not making enough connections with each other even though we are talking about the same thing!

88		
89	Top Tweeters in Entire Graph	Entire Graph Count
90	uniquetreee	321249
91	jolantru	198259
92	divebot	166515
93	bookdealalerts	140184
94	nowbyu	73558
95	jpnkevin_t	59776
96	ichinadian	59652
97	sealifeproject	53031
98	elizabethbastos	51551
99	artcollisions	49707
100		

However, as with many other things in life, it is not only about the quantitative measurement, but also about the qualitative measurement. This is evidenced by the list of top tweeters arranged according to how many tweets those accounts have sent out, regardless of topic. Sometimes, in the world of social media, more is simply more, and not better. Information should be invested and shared wisely, whilst still maximising reach.

The list of top tweeters arranged according to how many tweets those accounts have sent out, regardless of topic.

There is an easy way to assess this reach, to use quantitative data to assess qualitative impact, and we do this by examining the size of the vertices. Remember, vertices represent Twitter accounts/users, and therefore the size of the vertex is determined by the number of followers that vertex has. As you can see, the top tweeters on the top are not featured in the top 35 accounts on the bottom.

	A	Z	AD	AE	AF	AG
1		Re				
2	Vertex	Name	Followed	Followers	Tweets	Fa
3	soundcloud	## SoundCloud	20973	2039077	13815	
4	linkedin	## LinkedIn	1120	1244117	14790	
5	noaa	## NOAA	111	466435	8884	
6	oceana	## Oceana	1829	243771	22043	
7	montereyaq	## Monterey Aquarium	3481	80332	22628	
8	bangoruni	## Bangor University	1046	26126	9723	
9	drGuyHarvey	## Guy Harvey	4164	23385	5645	
10	jenniferlagarde	## Library Girl	1766	18727	30067	
11	bas_news	## Antarctic Survey	2058	14442	3309	
12	studyabroad101	No → Abroad101 →	2344	10305	5960	
13	dremmaljohnston	## Prof Emma L Johnston	3167	9330	13636	
14	thinkuhi	## UHI	4282	9026	4043	
15	snapzu_science	## Snapzu Science	1146	6650	6921	
16	fieldstudiesc	## Field Studies Coun	419	6195	3512	
17	artariusmedia	No Artarius Media	5565	5358	37042	
18	tessasproule	## Tessa Sproule	4730	5280	15304	
19	biminisharklab	## BBFSF Sharklab	147	5268	3555	
20	sunyesf	## SUNY-ESF	1691	5197	6136	
21	uniofgothenburg	## Uni of Gothenburg	38	4732	780	
22	watertrends	## Water News Global	5004	4482	28629	
23	earthworksjobs	## Earthworks-Jobs.com	0	4027	9166	
24	scoamarineinst	## SAMS	831	3968	3636	
25	oikossokio	## Prof. Carlos López	3848	3951	21867	
26	euanritchie1	## Euan Ritchie	1091	3931	24201	
27	echinoblog	## Christopher Mah	1412	3558	30244	
28	unetweets	## Univ. of New England	532	3307	7032	
29	elizabethbastos	## Elizabeth Bastos	4473	3233	51551	
30	gbrmarinepark	## GBR Marine Park	742	3144	3675	
31	cardiffcurator	## Cardiff Curator	1774	3085	6535	
32	brentwoodnews	## Brentwood News	136	3007	7626	
33	savethebayri	## Save The Bay	623	2957	2983	
34	beingwell4ever	## beingwell4ever	2872	2908	46022	
35	jolantru	## Joyce Chng (JDamask)	2346	2886	198259	

Top 35 Twitter accounts (with the most followers) featuring marine topics (or hashtags).

The size of the vertex, not the number of tweets, matters

The largest vertex of this crawl has over 2 million followers (in case you were wondering, it's not me). Reaching 2 million people with a tweet about #marinebiology or #marinescience puts us, statistically, still not at even a percentage point of the data travelling through the network, but it does hugely increase the reach of the hashtags. The top 35 accounts in this crawl combined have over 4.3 MILLION followers, or 1.4% of Twitter users engaged in discussions about #marinebiology or #marinescience. That's a lot of people, people! The vertices can then further be

clustered into related groups, or by location, or by many other attributes, and this enables the user to identify major stakeholders, or statistically-identified constituencies. Knowing your audience is valuable and can be used to direct information to your end-user in a way that will be important to them, further increasing the value of information.

Is it all about #marinebiology or #marinescience?

The short answer is no. The longer version is that NodeXL will not only cluster vertices, but it will also pick up any other hashtags used with recurring

frequency alongside the original search terms. This is especially helpful if you are trying to expand your audience, or trying to gauge current, topical conversation on Twitter. You can see that along with the original hashtags I searched, users are pairing those with others, such as #wormwednesday, or #ocean.

Networking platforms are dynamic, and a search of the same hashtags this week will not yield the same results, so repeated measure analysis could be one way that we assess the cycles of information moving through social media.

26		
27	Top Hashtags in Tweet in Entire Graph	Entire Graph Count
28	marinebiology	150
29	marinescience	94
30	wormwednesday	26
31	nature	22
32	science	12
33	ocean	12
34	biology	10
35	seaturtle	9
36	sharks	8
37	conservat	6
38		

Frequent topics (hashtags) tweeted.

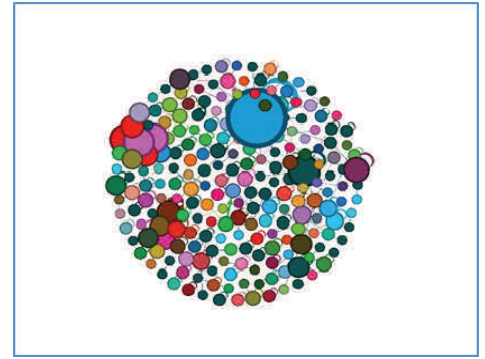
Finally, the visualisation!

There are so many metrics and ways of looking at these data that I have not discussed here (in the interest of both your time and mine). In my opinion, one of the most powerful things that these two tools can offer in SNA is the visualisation of networks. You can use either NodeXL or Gephi to make your network graphs, and I have used Gephi for both figures presented on the top. With the help of either program, a network that looks like chicken scratch on paper can be transformed into a colourful, and hopefully informative, graph that visualises the network found within the search terms specified in the original crawl. I have placed the images in order of transformation, so that you can see the progression of the graph itself.

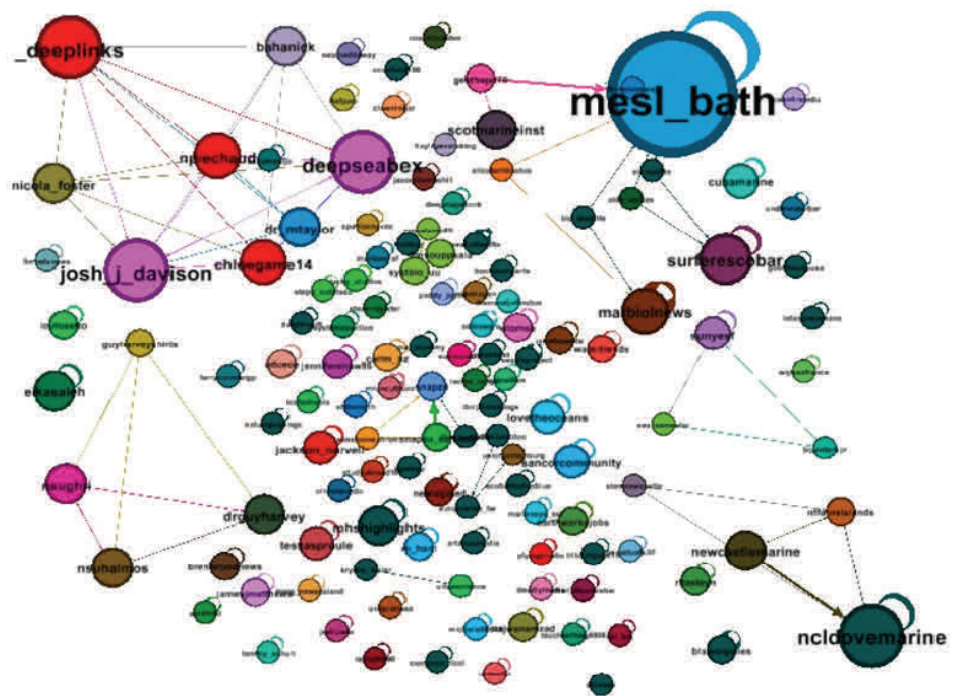
The first level on analysis on the top left is sizing the vertices (nodes) by degree. Degree is a measure of relatedness, or in other words, how many edges (links) each vertex has. Many of the vertices in this network have no degree, the accounts used the hashtag #marinebiology or #marinescience but did not make any connections. The larger the vertex, the more connections. Each vertex was the further coloured by location, so each colour grouping represents a common location. The vertices are then clustered by centrality, then filtered by degree so that anything



The first level of analysis measures the vertices (nodes or Twitter accounts) on the degree of relatedness.



The larger the vertex, the more connections. Each colour grouping represents a common location.



The visualised network of Twitter users who used the hashtags #marinescience or #marinebiology during the third week of May.

with a degree of one is removed. This results in a removal of several vertices and edges, and so the final product only shows 57.2 % of the original network. This tells us, once again, that a significant portion of the original network obtained in the crawl is not connected. Finally, one can label the

vertices that are left and pull apart some of the smaller clusters in order to see the edges.

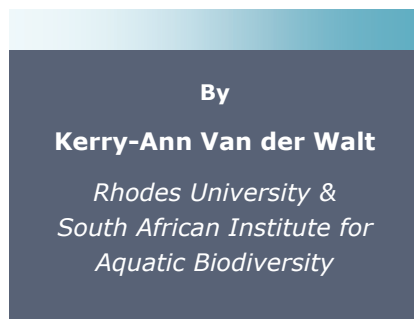
There you have it. The visualised network (bottom figure) of Twitter users who used the hashtags #marinescience or #marinebiology at some point in a week in May, the connections of the larger

clusters, the vertices sized according to the number of edges, and finally, each vertex coloured by geographical location and labelled with the Twitter account name. Can you find yourself in there?

Summing up

In summary, taking the time to look at social media reach and connectivity can tell one a lot about who is talking to whom, where the large hubs of information can be found, what else besides your original search term these users are talking about, and lastly, where the gaps in communication are. You can then use this to target and direct your information sharing. You can fill in the gaps, creating connections where they could not be found before, you can connect with those in your geographic area, and, you can expand the reach of marine science/biology across a potential network of 310 million users. All for a simple 140 character micro-blog on a free, accessible, worldwide network. If you are interested in science communication, SNA is a powerful investment you can make to increase the value of your most valuable currency: information. ✂

OWSD Science Communication Training Programme for female scientists and researchers 2016



The ability to communicate one's research is one of the soft skills essential in the development of science professionals. As researchers, we spend the majority of our time focusing on how to do science and less time on how to effectively communicate our science to the public. This applies to marine scientists as much as any others, and in order to be more effective we need to dedicate a healthy amount of time to actually communicating our research. Benefits to society can include making real contributions to the effective management of shared natural resources or, for the researcher, access to funding opportunities. Unfortunately, many scientists lack the skills needed to do this, or are not clear about where to start.

This year, 25 of 400 female applicants from various research faculties and fields were invited to attend a science communication workshop offered by the Organisation for Women in

Science for the Developing World (OWSD) South African National Chapter and the British Council. This workshop was a component of the first phase of a programme of Professional Development for Female Scientists in South Africa as part of a joint project between the Academy of Science of South Africa (ASSAf) and the British Council Newton Fund (UK). The project aims to support Female Scientists and Researchers to develop their skills in science communication and engagement through a year-long training programme, beginning with a 3-day workshop with a master class UK trainer in science communication and engagement.

I found when I got there, that I was the only marine scientist selected to attend this programme. This enabled me to learn as well as share ideas on how best to communicate science particularly, in my case, marine science.



Successful Candidates, Trainer, British Council and ASSAf members .

Young female scientists and researchers were brought together for three days of intensive science communication training run by Diana Pound from Dialogue Matters. Diana is an expert trainer in science communication and engagement. The first part of the programme was a science communication and engagement workshop. This was very exciting as it involved meeting and interacting with other female scientists who were all very intelligent, warm-hearted, friendly and hungry to learn. After the welcome and introductions we dived straight into the course and what we hoped to gain from it. The important thing for me, was to work on my networking skills and presentations for marine science conferences, improve my knowledge about media interactions and learn how to promote my research to fellow marine researchers as well as the public. The day was jam packed, very interactive and fun. During the social interaction that evening we were able to learn more about each other, our research as well as what we hoped to gain from this experience.

On the second day we each presented our research to a small group whose brief was to critique each presentation

based on what we had learnt the previous day. We also learnt about policy briefs, press releases, social media and knowledge exchange. I thoroughly enjoyed this, as one does not directly learn this in academia and as a marine scientist, one needs to be able to employ these tools in order to promote one's research.

The third day concentrated on workshop design and different facilitation techniques. Other aspects covered were the co-creation of knowledge and maintaining momentum. This was important because it emphasised that by supporting one another's engagement with the public one can collectively influence how women see science and perhaps promote young women to take science subjects in schools and universities. I see this as especially important as it can encourage young women to actively seek opportunities in aquatic sciences and help address representation concerns in marine science.

Overall this experience was extremely beneficial for me. I learnt things about

which I was unaware and that will certainly help promote me as a researcher, especially in a field in which women are under-represented. The connections I made from this workshop are invaluable and I hope to collaborate with one or two individuals. I also aim to take the knowledge that I gained from this workshop and offer a workshop at my institute, the South African Institute for Aquatic Biodiversity, where I will use my and other marine research undertaken at SAIAB as an example to teach other postgraduates about the most successful ways to communicate marine science. By sharing the knowledge I received, I hope to assist fellow researchers and students to promote their science. ✂



Group discussion around maintaining momentum, with Kerry acting as facilitator.



Kerry-Ann Van der Walt is a PhD student at Rhodes University and is affiliated with the South African Institute for Aquatic Biodiversity (SAIAB) where she researches the ecophysiology of marine fish and invertebrates as well as climate change under the supervision of Dr Nikki James. She was one of 25 successful applicants to be awarded a place on a recent Organisation for Women in Science for the Developing World (OWSD) Science Communication Training Programme for female Scientists and Researchers.

Citizen Science as a tool for Chondrichthyan Monitoring

By

Lisa Schroeter

*South African
Elasmobranch Monitoring*

When it comes to South African marine wildlife, there is one group of animals that would almost certainly make it to the top of the popularity list: Sharks. They are feared by many, loved by some and studied by only a few. If we add rays, skates and chimaera, we count 204 Chondrichthyan species that occur in Southern Africa – making it the world's 4th most diverse region for cartilaginous fish. Considering that 29% of Southern African Chondrichthyans are classified as threatened and another 29% are lacking data for assessment, it should become a priority to obtain more information on abundance, habitat use and potential threats for those species. Like most marine surveys, the monitoring of sharks, skates and rays is rather costly and funding for long-term or large-scale surveys is rare. This is where citizen science can step into the breach.

A number of recreational and professional marine user groups frequently encounter Chondrichthyans and they can deliver critical baseline data on species abundance and distributions.



Shark in a rock pool.

The ELMO (South African Elasmobranch Monitoring) project started in August 2015 with the aim to provide a platform for Chondrichthyan-related citizen science data and educational material. At present there are two basic types of data that are administered in the ELMO project: Direct observations and indirect observations.

Direct observations include underwater sightings, observations on fish markets as well as strandings. The latter is of particular concern for endemic catsharks (*Scyliorhinidae*), Lesser guitarfish (*Acroteriobatus annulatus*) and Smoothhound sharks (*Mustelus mustelus*) as presently available data



Eggcases provide clues to seasonal changes in reproductive behavior and habitat use.

shows that these species prevail amongst dead finds.

Empty eggcases are an indirect measure of species presence and a useful tool to track seasonal changes in reproductive behavior and habitat use. Comprehensive ID keys to South African

shark and skate eggs are available on the project website and free to use and distribute.

To date we have recorded over 2000 eggcases and hundreds of sightings. The raw data is freely available to researchers, NGO's and educators via iOBIS or obtainable directly from the project founder, Lisa Schroeter. Furthermore an interactive map enables the general public to explore our South African Chondrichthyan diversity virtually.

Citizen science does not attempt to replace traditional scientific approaches, but should be regarded as a meaningful addition that can provide large-scale and long-term information without the requirement of immense financial support. At the same time it serves as an effective educational tool for the general public and can be used to promote a better understanding for the value of our outstanding endemic diversity. The ELMO project encourages open data sharing and communication between organisations with similar interests, thus the data is automatically disseminated to other citizen science projects. We would like to encourage researchers, marine enthusiasts and anyone who could contribute data to take part in the ELMO initiative. For more information please visit www.elmoafrica.org or contact Lisa at elmoafrica@posteo.org. ☞

Participate in the SANCOR Sessions

at the

[3rd National Conference on Global Change 2016](#)



International GODAE OceanView Summer School

2-13 October 2017

Mallorca, Spain

New Frontiers of Operational Oceanography

The international school for observing, assimilating and forecasting the ocean is a two week program offered to early career scientists, professionals and students on the current state of the art in operational oceanography and related advances in the ocean sciences. The courses will include topics covering the leading edge science in ocean observing systems, as well as the latest methods and techniques for analysis, data assimilation and ocean modeling. For more information please visit the [GODAE Summer School website](#).

Two exciting new citizen science projects for recreational anglers

By

**Rose Thornycroft,
Colin Attwood and
Warren Potts**

*South African National
Biodiversity Institute,
University of Cape Town,
Rhodes University*

Two new citizen science projects were launched at the end of April, both aimed at the recreational angling community: *CatchReport* and *Fishtory*.

CatchReport provides recreational anglers and spearfishers with a portal through which they can record and store their own catch data from their smartphone or computer. The data are stored on a server, but can be retrieved at any time using their personal profile number. At the same time, non-personal aspects of their data are written into a common data-base for scientific analysis and reporting. Scientists will analyse trends in the catch data and feed these analyses back to anglers via the website in newsletters and research papers.

Fishtory will use historical angling photos to track the long-term state of marine fish stocks and to set baselines for current stock assessments. Historical



Recreational anglers taking advantage of spring tides on Durban Pier (Photo by Kerry Sink).

data for recreational fishing in South Africa is hard to obtain, as official recreational catch reports are sparse and inconsistent. Fishers possess a forgotten treasure in the form of old catch photos, angling journals and newspaper clippings. These records provide valuable insights into what stocks looked like over the past 100 years, and how the distribution, composition and sizes of fish have changed in that time. When collated in a scientifically robust way, these photographs will provide a fascinating visual record of angling and coastal fish in South Africa.

Both of these initiatives are merged under the umbrella project *FishforLife* which is a collaboration between the South African National Biodiversity Institute (SANBI), the University of Cape Town (UCT), Rhodes University (RU), the South African Institute for Aquatic Biodiversity (SAIAB) and WWF-South Africa. A unique feature of the *FishforLife* project is the provision of a central data portal, the *FishforLife* webpage www.fishforlife.co.za which allows citizen scientists to log their catches and post images, acting as an information portal. Equally importantly, feedback on research will be shared via this platform.

Why is there a need to gather data from recreational anglers? Although big commercial fisheries are well managed in South Africa, such as hake, sardine and kingklip, the recreational species are suffering neglect. Part of the reason is the huge diversity of fishes that recreational anglers target. Each of these species needs to be assessed regularly, which is a very expensive exercise. A bigger problem is that there are very poor data sets available for most recreational species. Unlike commercial fish catches, which are monitored and subject to mandatory reporting, recreational catches are not monitored or recorded by DAFF. Individual anglers often keep records and clubs usually keep records of competitions – but these data are not collated nor made available for assessments. Every time anglers go out, they generate useful data, but the vast majority of it is lost. Some spectacular angling results are recorded by anglers - either reported in the media or captured on photographs - but the general trends are lost, because the null events and mundane catches are never recorded.

Already many recreational angling species have been compromised, and some are now so rare that the International Union for the Conservation of Nature has Red-Listed them as Threatened. Some iconic angling species are in this category, including red

steenbras, seventy-four, and dageraad. The listing of dusky kob is likely to follow soon. According to national and international policies and management protocols such species should be protected from exploitation. It is therefore of paramount importance that no species be allowed to decline to levels that will trigger fishery closures. Enter FishforLife: recreational angling catch data is the most useful source of information for managing recreational fisheries. FishforLife is a portal to allow anglers to record this important data and address the huge “data gap” for this sector.

How to participate

CatchReport

Individual anglers can lodge their social data directly into FishforLife by logging onto and registering with the [CatchReport](#) website. All one has to do is to fill in the necessary drop-down menus and click ‘submit’ and the job’s done. It is important that users only report what they catch, release and make note of a ‘no catch’ scenario as even when no fish are caught this is important information. Apart from contributing to a national data base on the state of our fish resources, the angler will also have access to his/her own data. *CatchReport* therefore effectively serves as a personal fishing logbook. All data stored in the central



A kob caught back in 1970. One of the photographs submitted to Fishtory by Eugene Beukes.

database will be available to selective research institutes for analysis and research which will be reported on and made available directly back to the anglers and associations via the website and future newsletters.


Angling Clubs are especially invited to participate: competition records will be automatically captured via a standard Excel interface tailored for each angling discipline. Submitting of data will be done through the participating event organizers with no input from the individual competitor required. Data from competitions are the most valuable as these data are robust and verify-able. Associations who have collected competition data in the past are requested not to overlook or ignore the incredible value of their historical data

which may be submitted by way of the competition spreadsheet which is available for download. The longer the time series in the dataset the more accurate a picture will emerge.

Fishtory

To participate all you have to do is upload your historic angling photographs to Fishtory through the [FishforLife webpage](#). You can upload scans or good quality photograph “copies” of the original photos. If you have large collections of photographs or are unable to upload your photos yourself please contact us and we will facilitate the upload process for you.

For more information specifically on Fishtory please visit the webpage www.fishtory.co.za. You can also join the Fishtory specific online community on Facebook ([Fishtory](#)) and follow the Twitter handle [@FishtorySA](#).

For more information on the FishforLife project as a whole please contact r.thornycroft@sanbi.org.za. You can also find us on Facebook ([FishforLifeSA](#)) and twitter [@FishforLife](#). 



Applications are open for the MSc degree in Applied Ocean Sciences

The course aims to produce marine professionals with a strong academic foundation who are knowledgeable about the major topics in interdisciplinary ocean sciences. This course will provide academic and technical skills to deal with the most applied aspects of oceanography and marine biology. It is designed for both recent graduates as well as those with several years' experience and who wish to work in the ocean services sector, with a focus on operational and conservation activities and other aspects of the Blue Economy. [Click here for more information.](#)

Closing dates:

- International students: 31 August 2016
- South Africans: 30 September 2016

Call for Applications: IIASA Postdoctoral Fellowships

Postdoctoral Fellowships are available at the International Institute for Applied Systems Analysis (IIASA) for Researchers in:

- Natural and Social Sciences
- Mathematical Sciences and Modelling
- Interdisciplinary and Sustainability Sciences
- Integrated Assessment
- Management and Policy

IIASA located in Schloss Laxenburg near Vienna, Austria, provides full funding for a number of postdoctoral researchers each year. Scholars conduct their own research on topics closely related to one or more projects on IIASA's agenda.

Upcoming application deadlines:

- 2016: 1 October
- 2017: 1 April, 1 October

Postdoctoral positions are of up to 2 years' duration, and can begin up to 6 months after selection. IIASA is an international institute engaged in scientific research that aims to provide support for policymakers on issues of importance in the following global problem areas:

- Energy and Climate Change
- Food and Water
- Poverty and Equity

[Visit the IIASA website for more details.](#)

First African black oystercatcher hatched at SANCCOB

By

Roxanne Abrahams

SANCCOB

The Southern African Foundation for the Conservation of Coastal Birds (SANCCOB) has successfully hatched and hand-reared the first African Black oystercatcher (*Haematopus moquini*) at its seabird centre in Cape Town, South Africa.

Established in 1968, the non-profit organisation is well known for its work with endangered African penguins and has been successfully hatching African penguin and other seabird eggs for more than 5 years. However, the recent addition of a specialised Chick Rearing Unit is a first for the organisation.

Rescued from an iron ore terminal on the West Coast of the Western Cape (South Africa), the oystercatcher egg was admitted to SANCCOB's Chick Rearing Unit and placed in a specialised incubator. After 15 days of incubation, the egg successfully hatched on Valentine's Day (14 February '16), with the chick weighing in at a healthy 42 grams. As with other new hatchlings, a big concern for the SANCCOB staff was to prevent the little chick from imprinting on humans and consequently not being able to be released back into the wild.

They also wanted to give the new hatchling a suitable companion. As a solution, the team disguised one of its Bank Cormorant fluffy toys from its curio shop to mimic an adult oystercatcher using red veterinary wrap.

Nicky Stander, SANCCOB's Rehabilitation Manager, said: "Disguising the fluffy toy worked extremely well and we were able to use it to demonstrate to the chick how to feed. He was a very fast learner and he had no trouble feeding or drinking water, with the help of his surrogate mom."

The chick's regular food consists of redbait, limpets and mussels, which mimics its natural diet. It was also given closed-shell mussels to encourage it to practice prying them open – as it would do in the wild. At first it struggled, but now manages this feeding practice well. At just under one month old, the oystercatcher is sprouting its first juvenile feathers and will soon be ready to take its first flight. The SANCCOB team anticipates its release in the next few weeks on the West Coast outside Cape Town.

The African black oystercatcher may be found off the mainland coasts and islands of Southern Africa. Their diets



The chick with its surrogate mom.

consist mostly of mollusks, such as mussels and limpets, but have also been observed eating fish and insects. They use their strong bill to pry open mussel shells and loosen limpets off the rocks. The species is listed as Near Threatened by the IUCN Red List of Endangered Species and with only 6,000 breeding pairs remaining in the wild, these birds hold a significant conservation value.

As a non-profit organisation, SANCCOB seeks the assistance of the public to continue rehabilitating the African black oystercatcher and the many other seabirds currently in its care currently. Should you wish to make a donation or request information, please visit the [SANCCOB website](#) for more details. ✂

The future of SANCOR

By

Louis Celliers

*SANCOR Steering
Committee Chairperson*

SANCOR has a long and distinguished history of contributing to the organisation and growth of marine and coastal research in South Africa. Since its original conception, as the South African National Committee on Oceanographic Research (SANCOR) in 1956, it has managed the first coordinated programme of basic marine research in South Africa. Reconstituted in 1993, the South African Network for Coastal and Oceanic Research (again, SANCOR) intended to coordinate, facilitate, stimulate and review marine science, engineering and technology whilst aiming to promote wise and informed management of the use of the South African oceanic and coastal environment. The “new” SANCOR was again a valuable contributor to the growth and development of research in the marine and coastal environments.

Since the reconstitution of SANCOR, the South African political, environmental, social and economic context has shifted to what we experience as the current reality of 2016. The emphasis on sustainable national development, the growth of the Oceans Economy, and the Marine and Antarctic Research Strategy are only three, of many other, strong signals of new research demands. This is in context of societal transformation, national capacity development for ambitious growth and development targets, and the burgeoning need for natural resources in a rapidly changing climate with an uncertain future. For all the change that South Africa has experienced, never before has a SANCOR-like institution been so relevant and valuable in its utility to coordinate and guide, despite the fact that the current institution is clearly on the cusp of a third reconstitution.

Nonetheless, many of SANCOR’s, structures, functions and plans, as reconstituted in 1993 to the present

day, are no longer in touch with the current South African reality, and a much broader conception of research is required for national development, and the sustainable utilisation of coastal and marine resources. As such, SANCOR in its present form is politically tainted, structurally outdated, and largely disconnected from the South African marine and coastal research community. SANCOR indeed requires a bottom-up reconstruction, retaining a number of valuable and effective current activities (e.g., MCEN, SAMSS, the networking mechanisms, student support and visibility and the working groups), but largely forming a new institution based on a redefined vision, goals and objectives. A new coordinating institution should seek a much wider conception of oceanic and coastal research that includes the natural sciences, the humanities, industries and non-governmental organisations, promote trans-disciplinarity, and are dramatically transformed to include all stakeholders.



Request for feedback

If you have an opinion on the past and future of SANCOR please send your comments to Louis Celliers (lcelliers@csir.co.za). SANCOR is a science community that exists for the benefit of its members. Please use this opportunity to provide input on the future of SANCOR.

Louis Celliers

SANCOR Chairperson on behalf of the Steering Committee

In light of the proposed constitution of an institution to address the challenges mentioned above, the following actions are open for discussion:

- With a mandate from the current SANCOR Steering Committee, initiate a process to engage key stakeholders in order to better understand the role of a coordinating institution;
- In the short-term, identify, maintain and improve the well-functioning activities of SANCOR;
- Initiate a debate on the potential leadership and fund-brokering role of a coordinating institution within South Africa;
- With a mandate from the marine and coastal community, constitute a new institution to coordinate and provide research leadership in the next decade; and
- The relationship between the science community represented by a coordinating institution, and Government departments and agencies.

The SANCOR Steering Committee recognises the past value, importance and contribution of SANCOR to a cohesive marine and coastal research community in South Africa. The past and current success of SANCOR must create the basis of a new and relevant institution that will provide and promote marine and coastal research coordination and leadership in South Africa. ✂

SANCOR Student Meeting in the Eastern Cape

SANCOR hosted a Student Meeting for Postgraduates in the Eastern Cape on 14 June 2016 at the NMMU South Campus. The meeting was chaired and facilitated by SANCOR Student Representative, Rita Steyn, and was themed: "What is mankind without the sea? Marine Systems and Their Human Dimensions".

The event was well attended by over 80 postgraduate students in the region, from Nelson Mandela Metropolitan University, University of Fort Hare, Rhodes University and Walter Sisulu University. The meeting aimed to provide students from various disciplines in the field of marine and coastal sciences with the opportunity to meet and interact with each other as well as showcase their research. Click

here to view the abstract book. The meeting consisted of a mini-symposium as well as a panel discussion and workshop on science communication.

Keynote speakers included Prof Patrick Vrancken (South African Research Chair in the Law of the Sea and Development in Africa), and Ms Sibongile Mokoena (SAEON Head of Education). The science communication workshop session of the meeting was also facilitated by Rita. The panel consisted of award-winning science communication professionals such as Ms Ingrid Sinclair (Digital Communications Coordinator from the Two Oceans Aquarium), Mr Paul Kennedy (Science Communicator for ScienceLink) and Ms Penny Haworth (SAIAB Communications & Governance Manager). ✂



Student participants at the Eastern Cape Student Meeting. Photo by Rita Steyn.

SANCOR Forum at NMMU— crossing the boundaries of research, policy and management

The annual SANCOR Forum Meeting was held on 15 June 2016 at NMMU was chaired by SANCOR Forum Chair, Associate Professor Sophie von der Heyden and was themed “Mind the gap - challenges in crossing the boundaries of research, policy and management.”

This forum is held annually to maintain and provide a platform for exchange of information on regional, national and international developments in science in the marine and coastal environment, and where issues can be brought for debate, and the development of approaches for their resolution.

The purpose of the 2016 forum was to bring together South African marine and coastal research community to build on common positions and perspectives towards research integration in management and policy.

Research underpins knowledge, which is a key resource in any economy. Yet although an absolute necessity to ensuring that research benefits the nation, closing the gap between research, knowledge production and management remains a complex challenge. The forum discussed approaches to integrating research into practice and policy, not only at a

regional, but also a global level and provided an avenue for reflection and discussion on how best to bridge the science-policy-management divide.

Prof Mandy Lombard, NMMU Research Chair in Marine Spatial Planning, presented on a research programme to inform ecosystem-based Marine Spatial Planning in South Africa. Prof Lombard reflected on current legislation within the marine and coastal landscape and cited examples where scientists were proactively involved in policy. She demonstrated how a wide range of marine research studies are incorporated in Marine Spatial Planning, from determining catch limits to the marketing of sustainable seafood consumption, to the establishment of Marine Protected Areas.

Mr Peter Lukey, DEA Chief Policy Advisor: Strategic Environmental Intelligence, reflected on the challenges to evidence-based policy-making. One of the main barriers to the use of evidence in policy making was attributed to cultural differences between scientists and decision-makers. Other barriers included: the availability and access to research, clarity, relevance and reliability of research findings as well as the time it

takes to make a decision (an estimate of five years required from proposal application to produce a peer-reviewed publication). Mr Lukey presented four primary models believed to increase knowledge exchange among scientists and decision-makers. He gave examples and advice on how to customize scientific communication for policy-makers.

Dr Louis Celliers, CSIR Coastal Systems, Natural Resources and the Environment: Principal Scientist and Research Group Leader, discussed the high cost, complexities and energy involved in traditional research planning and expectations to influence decision making in the public sector without a systematic impact process. This process could be circumvented through transdisciplinary research. Transdisciplinarity, the highest form of integrated research, involves not only the natural, social and health sciences in a humanities context, but also incorporates non-academic participants (e.g., land managers, user groups and the general public). This level of integration combines inter-disciplinarity with participatory approaches, and transcends traditional disciplinary boundaries.

Dr Kim Prochazka, DAFF Fisheries Branch: Director Resources Research, discussed

bridging the gap between science, policy and management and presented some experiences from South African fisheries.

Dr Prochazka outlined the stepwise process to achieve rational, responsible, transparent and accountable, evidence-based decision-making. In this context, science provides advice not decisions.

A panel discussion, chaired by Dr Lara Atkinson, discussed examples of South Africa's success in the international arena, the lack of economic information. Communication and trust were considered key to close the gap between science and policy.

As the SANCOR Steering Committee Chairperson, Dr Celliers presented on the SANCOR 2025 plan to re-envision SANCOR. This will be a community driven process and the following strategic objectives have been proposed:

- Authentic human capital development and transformation;
- Knowledge generation and the development of research capability relevant to the SA society;
- Excellence in networking, coordination, public awareness and education;
- Greater success in adopting inter- & trans-disciplinary research.

[Click here to view the speaker presentations.](#) ☞

Gilchrist Lecture at NMMU

To promote excellence in science, SANCOR hosted the Gilchrist Evening Lecture. The Medal serves as recognition of the recipients' contributions to marine science, to further stimulate excellence in South African marine science, and to focus attention on South Africa's marine and coastal environments. The award is named after John D.F Gilchrist who played a significant role in pioneering ichthyology (the study of fishes) in South Africa.

Gilchrist Memorial Medalist, Prof Coleen Moloney from the Department of Biological Sciences and Marine Research Institute, University of Cape Town, presented the lecture entitled: "Weaving marine food webs under global change". The medal is given in recognition of excellent contributions made towards marine science in South Africa. The lecture was preceded by a presentation from, SANCOR Student Travel Award Winner of 2015, Ms Taryn Murray. ☞



Save the date for SAMSS

4-7 JULY 2017

SANCOR convenes THE triennial Southern African Marine Science Symposium (SAMSS) to stimulate interaction and promote the exchange of information on regional, national and international developments in marine and coastal research.

The 2017 edition of SAMSS, the 16th in the Series, will be hosted by the Institute for Coastal Marine Research at the Nelson Mandela Metropolitan University. The symposium will take place during 4-7 July 2017 in Port Elizabeth.

Further announcements to follow.

Public review: Global Climate Observing System Implementation Plan 2016



Get in comments by 5 September on the latest plans for this international programme focusing on climate observations.

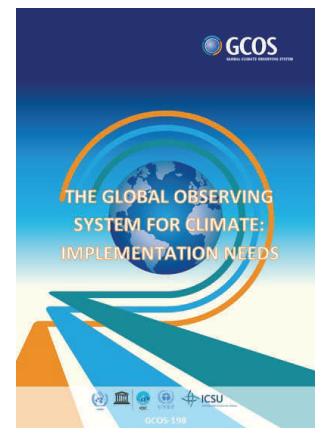
The Global Climate Observing System (GCOS) has announced that it is taking public comments on its draft 2016 Implementation Plan. The plan will guide the programme's activities

around coordinating international climate observations for the next decade. It will replace GCOS's 2004 Implementation Plan, which was last updated in 2010, and takes "into account the latest developments in earth observations and climate policy."

The programme plans to submit the final version of the plan to the United Nations Framework Convention on Climate Change during the 22nd Conference of the Parties (COP22) in November in Marrakesh, Morocco. GCOS invites anyone with an interest in

climate observations to comment on the document.

The review period for this document is open now and extends until 5 September. To read the draft document or submit comments, [visit the GCOS site here.](#)



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Our Focus: Science in the Marine and Coastal Environments

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