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South African Network for Coastal and Oceanic Research

SANCOR'S CURRENCY AND STRENGTH IS INFORMATION

SANCOR Newsletter

Celebrating excellence in South African marine science

The South African Network for Coastal and Oceanic Research (SANCOR) is proud to announce the recipients of the triennial SANCOR Awards. The awards were presented on 22 June 2022 at the gala evening of the 17th Southern African Marine Science Symposium (SAMSS) held in Durban at the Elangeni Hotel.

The awards aim to recognize outstanding scientists, technicians, communicators and young researchers in the field of marine science. Nominations for these awards were submitted by members of the marine science community and assessed by independent expert panels.

We are pleased and delighted to announce the winners in the following categories:

The **Marine and Coastal**

Communicator Awards are made to individuals or groups of individuals in recognition of their outstanding contributions towards communication of information about the marine and coastal environment to the public via various media at various levels.

Russell Stevens is Head of Education at the Two Oceans Aquarium Education Foundation has made an exceptional contribution to marine science education and has spearheaded the marine sciences curriculum in high school for Grades 10-12.

Dr Kerry Sink (Marine Programme Manager and Principal Scientist at the South African National Biodiversity Institute). Kerry is at the forefront of science to policy in the marine realm and she has been an instrumental role player across

both of these spheres. In her role as principal scientist, she is responsible for coordinating and producing key scientific publications, but she has also made significant efforts to communicate her science to broader audiences.

The **Gilchrist Medal** is awarded to distinguished marine scientists. 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.

Dr Carl van der Lingen is a Specialist Scientist at the Department of Forestry, Fisheries and the Environment. Carl has published at least 117 peer-reviewed publications in excellent local and international journals and books. He is well known internationally for his studies on the ecology of sardine and anchovy, and his research on their feeding ecology has been seminal, stimulating similar work in other ecosystems.

Dr Lynne Shannon is Chief Research Officer at Associate Professor level in the Department of Biological Sciences at the University of Cape Town. Lynne has an exceptional publication record and has, to date, published more than 120 papers in peer-reviewed journals. The papers represent a breadth of topics that fall under her general umbrella of modelling research directed at incorporating ecosystem effects of fishing and climate change, as well as developing and testing marine ecosystem indicators by which these effects can be gauged. Lynne has – globally – made a major contribution in developing and refining models and sets of indicators to accomplish this.

Both Carl and Lynne have supervised many students to completion.

The **Derek Krige Medal** is awarded in recognition of outstanding achievements in the field of technical support to marine science in South Africa. The award of this

MARINE AND COASTAL COMMUNICATOR AWARD



Russell Stevens



Kerry Sink

DEREK KRIGE MEDAL



Johan Rademan



Dagmar Merkle

SANCOR YOUNG RESEARCHERS AWARD



Nasreen Peer



Denham Parker

GILCHRIST MEDAL



Carl van der Lingen



Lynne Shannon

medal serves to emphasize the valuable contribution to marine science made by those who provide the technical and logistical support services that make research possible.

Mr Johan Rademan is a Control Oceanographic Technician at the Department of Forestry, Fisheries and the Environment. He has developed acoustic systems for use during small boat surveys. This includes the design of the vessels such as modifications to reduce flow noise around custom built transducer mounts and cabin design to enable customized installation of scientific equipment. Johan has been at the forefront of developing acoustic methods to detect squid egg beds and spawning aggregations. He has successfully trained junior technicians for over 30 years.

Ms Dagmar Merkle is a Control Oceanographic Technician at the Department of Forestry, Fisheries and the Environment. Dagmar's understanding of hydro-acoustic data processing techniques means that the surveys group of the Fisheries Branch has remained at the forefront of acoustic applications in marine science. The success of the acoustic survey program is due in a large part to Dagmar's dedication and pride in her work. She takes a

leading role in passing on acoustic data processing skills to junior staff and students.

The **SANCOR Young Researchers Award** has been established to acknowledge a new generation of scientists and to encourage research excellence in science in the marine and coastal environment.

Dr Nasreen Peer is a lecturer at Stellenbosch University. Nasreen has produced 26 publications in local and international journals, many of which have been produced in collaboration with colleagues across South Africa. Nasreen has produced some of the seminal work on brachyuran crabs in South Africa and is particularly well known for her work in mangrove forests. Her involvement in the Inhambane Bay Mangrove Survey used a combination of standard ecological survey methods and traditional knowledge. This project is a multinational project which has integrated the indigenous knowledge of the people of Inhambane. Nasreen is an advocate for meaningful community engagement and co-ownership of research done in an ethical way. As one of the founding directors of Argonaut Science (Pty) Ltd, Nasreen has already perfected the art of translating science to

both young and old.

Dr Denham Parker is a Marine Scientist at the Department of Forestry, Fisheries and the Environment. Denham has published over 20 papers in high-impact journals. Much of his work is applied and has direct implications on how fisheries are monitored, assessed and managed in terms of stock status, population risk and impact on ecosystems. Denham has already made his mark in the world of international tuna science. He has attended and presented at an impressive number of working party meetings for South Africa's most relevant regional Fisheries management organizations, the International Convention for the Conservation of Atlantic Tuna (ICCAT) and the Indian Ocean Tuna Commission (IOTC). He was elected by his international peers into the position of vice chair of the scientific committee of the IOTC, the highest scientific body of this important forum. Very few scientists are entrusted with such a responsibility so early in their career, an indicator of his growing eminence in his field.

The SANCOR Steering Committee thanks the proposers of each award and the adjudication panels for their participation in the award process. Click [here](#) to read the award citations. Ø

Marine science for the future South Africa – SAMSS 2022

The 17th Southern African Marine Science Symposium (SAMSS) was held at the Elangeni Hotel in Durban during 20-24 June 2022.

The symposium was successfully hosted by the University of KwaZulu-Natal and the KZN Sharks Board, on behalf of SANCOR. The conference was themed: Marine Science for the Future South Africa and aimed to explore the links, continuity and changes in marine science of the past and present, with emphasis on how the science being done today will determine the 'future pasts' of our marine ecosystems and the people who depend on them.

The symposium stimulated interaction and promoted the exchange of information on regional, national and international developments in marine and coastal research. 444 abstracts were submitted from 72 institutions and 17 countries. Approximately half of the participants were students.

Minister of Forestry, Fisheries and the Environment, Ms Barbara Creecy, delivered the [opening address](#). In addition to the thematic

oral and poster sessions, highlights of the programme included:

- An Information Session entitled: "Marine Science Programmes in South Africa". The session was co-hosted by the NRF-SAEON Egagasini Node, NRF-RISA, NRF-SAIAB and DSI. The session aimed to provide an overview of ongoing and upcoming marine science and policy programmes, an opportunity for participants to engage with policymakers and science enablers, and an opportunity for students and early career scientists to engage on topics of interest to their skills and career advancement. Click [here](#) for the report.
- An interactive immersive theatre and public storytelling experience, *Lalela uLwandle* (Listen to the Sea), led by Empatheatre and researchers from the One Ocean Hub.
- Erwan Sola Art Exhibition - Fishbones & Chips: This series was an invitation to reflect and meditate on our consumption of seafood and the state of world fisheries.
- A public lecture by Professor



SAMSS 2022 participants in Durban. Photo :UKZN

Peter Ryan: entitled "Oceans of Plastic".

Awards for exceptional contributions made to marine science were given to scientists (Drs Carl van der Lingen and Lynne Shannon), communicators (Russell Stevens and Prof Kerry Sink), young researchers (Drs Nasreen Peer and Denham Parker) and technicians (Dagmar Merkle and Johan Rademan). Click [here](#) for the article.

The top symposium oral presentation was delivered by Luther Adams (first place) on mesophotic reef communities in the Amathole region, followed by talks from Nina Faure Beaulieu and Daneeja Mawren. The first place poster prize was presented to Thomas Petrus Arnoldus Botha for his poster on the taxonomic revision of squat lobsters, followed by posters from Leila Nefdt and Jamila Janna.

On the final day, workshops and courses were presented on:

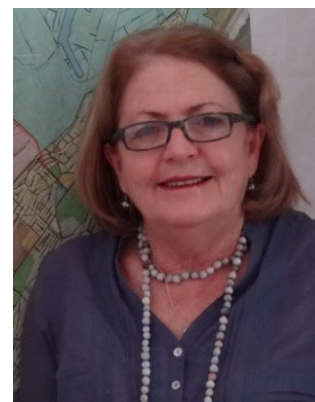
- Application of automated pattern recognition, computer vision, machine learning/artificial intelligence in marine science: Where are we in South Africa?

- Identifying next steps to advancing marine ecosystems assessments
- Next-generation sequencing applications in marine biology
- Seeing is believing: Incorporating multibeam bathymetry data collection into marine biological projects

The event allowed participants to showcase their latest research results and provided an opportunity to network. For many of the participants it was their first physical conference they attended since the COVID-19 lockdown. It was said that it was a great opportunity to meet new and old members of the marine science community.

The symposium was funded by the National Research Foundation, the Department of Science and Innovation, University of KwaZulu-Natal, KZN Sharks Board and Consol. ☞

In memory of Prof Di Scott



We received the sad news that Prof Di Scott passed away on 22 June 2022. Di was based at the University of KwaZulu-Natal (UKZN) Howard Campus for many years and retired in 2009, but she continued to be actively involved in research at UKZN and UCT. Di's research interests were in the field of environmental and climate change governance, environmental politics and sustainable urban development, with a particular focus on South Africa and KwaZulu-Natal. She and her post-graduate students also worked with environmental civil society organisations undertaking action research related to environmental and social issues identified as critical to these groups. She leaves behind her daughter Kirsten, son Dylan and two grandchildren. Our deepest sympathies to her family. *Words by Prof Brij Maharaj, UKZN. ☞*

Fisheries in South African Estuaries – The Way Forward

By

Alan Whitfield¹, Steve Lamberth², Paul Cowley¹ and Bruce Mann³

¹South African Institute for Aquatic Biodiversity

²Department of Environment, Forestry and Fisheries

³Oceanographic Research Institute

In a popular article published in the November/December 2019 issue of *The Water Wheel* (www.wrc.org.za/the-water-wheel/) we gave an overview of estuarine fisheries in South Africa and the impact fishing activities and environmental degradation are having on the ichthyofauna within these systems. This summary provides extracts of some of the major points raised in the above article (entitled *Fisheries in South African Estuaries – Are we on the Right Road?*) and highlights the six steps that we need to take in order to halt and reverse the steep downward trend in estuarine and coastal fish populations.

Most people living in the South African coastal zone acknowledge the value of estuaries in terms of enhancing the general quality of life of residents and also providing employment opportunities for people working in the building, recreational and ecotourism industries. Despite these systems being described as the 'jewels' or 'honey pots' of the coastal zone, they are not receiving the conservation and management attention that they deserve. For example, the development of Estuary Management Plans by the Department of Environment, Forestry and Fisheries (DEFF) in collaboration with the CSIR, and implementation by provincial authorities, is to be highly commended. However, the implementation of these plans still requires that management agencies are resourced with sufficient capacity and funding to implement the strategy and enforce regulations.

Similarly, the promulgation of the National Environmental Management: Biodiversity Act (NEM:BA) should have provided

some protection for overexploited estuary-associated fish species such as dusky kob and white steenbras – instead we have seen increasing pressures being placed on these species by the growing lack of coastal fisheries law enforcement and the opening up of parts of existing Marine Protected Areas (MPAs) to fishing, e.g. the Mbashe Estuary in the Dwesa Nature Reserve where fishing effort inside the reserve is now five times that outside the reserve. According to the Estuaries section of the latest National Biodiversity Assessment (NBA) published by SANBI, illegal gill net fisheries now account for more than half of the 3700 tonnes of fish harvested annually from South African estuaries.

When the original MPAs along the South African coast were declared, starting with the Tsitsikamma MPA in 1964, little or no attention was paid to estuaries – despite their role as important nursery areas for a number of marine fish species. Even recent proclamations by DEFF have tended to ignore the need for Estuarine Protected Areas (EPAs) and placed emphasis on new coastal

and offshore MPAs instead. However, the great success of the Stilbaai Marine Protected Area, that includes the Goukou Estuary as a no-take area, provides an excellent example of what works for the recovery of targeted estuary-associated fish species.

Additional regulations for the protection and recovery of heavily exploited marine fishes such as dusky kob (*Argyrosomus japonicus*), white steenbras (*Lithognathus lithognathus*), spotted grunter (*Pomadasys commersonnii*), leervis/garrick (*Lichia amia*), tropical/Natal stumpnose (*Rhabdosargus sarba*) and estuarine perch (*Acanthopagrus vagus*) have been approved by DEFF. However, only by implementing these regulations will we be able to reverse the downward trend in the catches of these species. Indeed, our scientists have shown that all of the above targeted fishes are now less than 25% of their original adult stock size and still declining!

Data collected from acoustic telemetry studies have highlighted the residency of juveniles to their natal estuary, with most species spending at least the first three



Dusky kob (*Argyrosomus japonicus*) shown here are targeted by both recreational and subsistence anglers in estuaries, significantly declining in both average size and number as a result of decades of overfishing and, more recently, widespread environmental degradation. The average size of dusky kob from illegal gill nets recovered in KwaZulu-Natal estuaries is now only 30 cm, whereas this species becomes mature at 1 m in length. Photos: ©Stywe Lyne - Tight Lines and ©Tor Naesje.

years of their life in the estuary. These tagging studies have also revealed alarming recapture rates, with estimates exceeding 50% in certain estuaries. Although recreational and subsistence fishers will individually deny any responsibility for the overexploitation, their collective impact is clear – these species are in crisis and currently even common fish such as the temperate/Cape stumpnose (*Rhabdosargus holubi*) are also beginning to show signs of significant declines in abundance.

Overexploitation of estuarine natural resources is not the only

reason for the decline in condition of many estuaries on the subcontinent. Poor catchment management that is often associated with high soil erosion rates, and excessive freshwater extraction in some systems for irrigation (which results in little or no river flow reaching estuaries for extended periods), are major problems for certain estuaries. Less important at present but likely to become a major problem in the near future is environmental pollution, especially organic and inorganic wastes from agricultural, industrial and domestic sources. Water pollution caused by defective sewage processing plants in coastal towns and cities is also having a

huge impact on declining water quality in our estuaries – which affects all living creatures associated with these environments, including ourselves.

Although excellent legislation exists to prevent pollution from entering rivers and estuaries, there are disturbing signs that the implementation of that legislation is being compromised by a number of factors, including the lack of maintenance of sewage processing plants by municipalities, inadequate financial resources in environmental law enforcement agencies, and the shortage of skilled human resources to document and prosecute parties

guilty of environmental degradation. The increasing levels of metals and persistent organic pollutants (POPs) in the flesh of fishes from certain estuaries, which has led to local authorities such as eThekweni Municipality recommending a fish consumption of less than 200 g per month of fish captured in Durban Bay, is not the way to go.

There is, however, good news relating to these jewels in our coastal crown. South Africa has 290 estuaries, including the large Lake St Lucia system which is a designated Ramsar and World Heritage Site. Indeed, St Lucia on

its own accounts for approximately 50% of the estuarine area in South Africa and is also one of the largest estuaries in Africa. This system is in the process of being rehabilitated by the iSimangaliso Wetland Park Authority after the devastating consequences of the removal and canalization of the uMfolozi Swamps in the 1950s and the separation of the uMfolozi River from the St Lucia Estuary for more than half a century. If the system receives excellent summer rains in 2019/2020 we may once again see a fully functional St Lucia Estuary and vibrant lake system contributing as a major fish and prawn nursery area



For centuries the traditional tsonga fish traps shown here produced a sustainable protein source for the local amaThonga people. However, a doubling in the number of fish traps since the late 1980s, the use of synthetic material to increase the efficiency of the traps at retaining small fish, and the introduction of illegal gill netting to the supposedly protected Kosi Bay system, has caused a complete collapse of this valuable fishery . Photo: © Alan Whitfield.



Part of a fish kill in the temporarily closed uMdloti Estuary caused by waters becoming oxygen depleted due to an oversupply of decomposing organic matter that was indirectly linked to excessive nutrient inputs from the river into the estuary. Increasing numbers of fishes in our estuaries are now also dying from pathogens introduced mainly by upstream aquaculture operations and the aquarium trade. Photo: ©Nicolette Forbes.

for a variety of important commercial, recreational and subsistence coastal fishery species.

Although only 1% of South Africa's estuarine area is well protected, several unprotected estuarine types (from a fish perspective) could be transferred to the well protected category simply by improving fishery management and water quality issues. For example, according to the recent NBA Report on Estuaries, 32% of South Africa's estuaries and 10% of the total estuarine area could be categorized as well protected if fishing effort in just three estuaries (Kosi, Knysna and Langebaan) was better controlled.

Fortunately there are some near pristine estuaries in the more remote parts of the Eastern and Western Cape Province – but growing human populations, especially in the former area, will inevitably place increasing pressures on the biodiversity, productivity and viability of these few remaining estuarine 'gems'. We therefore need to grasp the present window of opportunity to declare new EPAs that will be made accessible to people for non-destructive and non-consumptive recreational and ecotourist activities and, at the same

time, ensure sustained prawn, crab and fish production for the future.

So – is there a way forward? The answer is yes! – provided we implement the following six steps or a variation thereof, namely;

Fisheries regulations rigorously enforced by dedicated staff, especially the removal of all illegal gill nets from our estuaries.

Environmental legislation fully implemented by the relevant authorities.

Implementation of the Environmental Water Reserve for estuaries by the Department of Water & Sanitation (DWS).

Creation of a network of Estuarine Protected Areas (EPAs) for fishes, especially for currently overexploited species.

Estuary Management Plans (EMPs) that include no-take zones are prioritized and implemented for all major estuaries.

Improved angler awareness and compliance with regulations, including greater adoption of catch and release fishing within all recreational sectors.

If these or similar steps are not implemented as a matter of urgency by DEFF and DWS, in collaboration with designated provincial and municipal authorities, the future of our estuarine fisheries will continue on the current downward spiral and leave impoverished coastal fish and human communities in its wake. ☞

ATAP/SOSF Call for proposals - transmitter grant

We are pleased to announce the call for applications for an acoustic transmitter grant, funded by Save Our Seas Foundation and administered by the Acoustic Tracking Array Platform (ATAP), the value of which is US\$ 7 000. The grant is for the sole purpose of purchasing acoustic transmitters, and will not cover running costs or the purchase of any capital equipment. The transmitters must be used in an elasmobranch (shark, skates, rays, chimaeras) study, within the ATAP array. Click [here](#) for conditions of grant and application form. Applications are to be emailed to atap@saiab.ac.za

**Closing date:
02 September 2022**

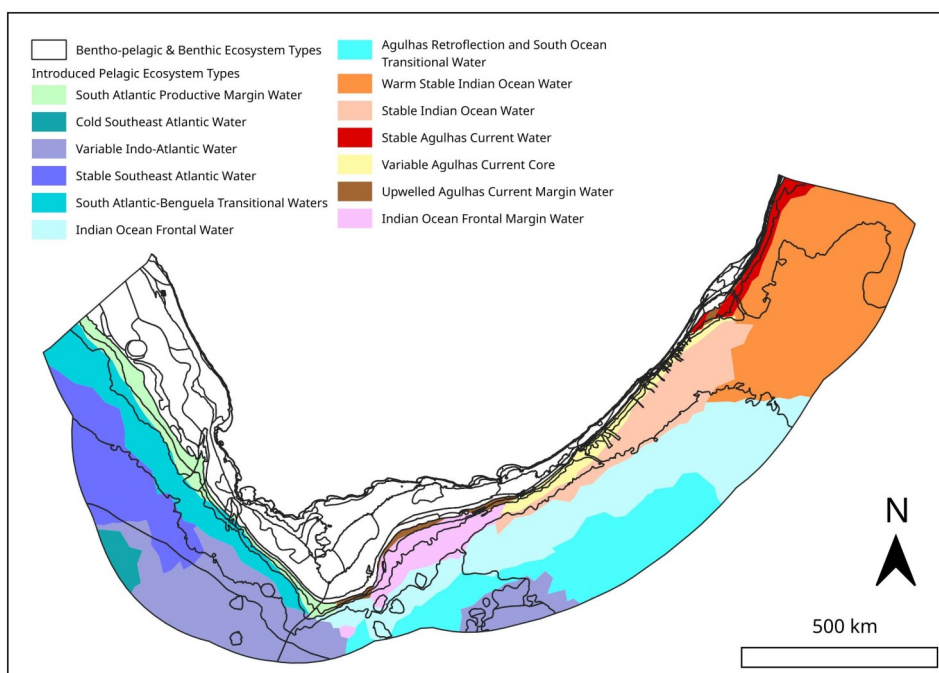
SANBI updates the Marine Ecosystem Map and Classification

By
Jock Currie
and
Kerry Sink

Marine Programme, South African National Biodiversity Institute

In March 2022, the South African National Biodiversity Institute (SANBI) updated the National Map and Classification of Marine Ecosystems, which underpins the assessment of marine ecosystem status and spatial planning for coastal and marine biodiversity in South Africa. The updates from the 2018 version of the map are relatively minor, but include the introduction of 13 pelagic ecosystem types, improvements in ecosystem descriptions and classification categories and better alignment with the IUCN global ecosystem typology. Decisions underpinning the updated map were guided by SANBI's Marine Ecosystem Committee.

In the 2018 National Biodiversity Assessment (NBA), a decision was made to create a single ecosystem map layer that captured both seafloor and water column biodiversity patterns. However, the



A map showing the newly introduced pelagic ecosystem types (in colour), together with the outlines of the benthic-pelagic and benthic ecosystem types retained from the 2018 Marine Ecosystem Map.

difficulty of doing so, especially at greater depths where the seafloor and upper water column are increasingly decoupled, prompted considerations of re-introducing a pelagic layer. The decision to do so was taken at the December 2021 MEC meeting. Besides accounting for diminished benthic and pelagic connectivity in the deep ocean, the introduction of pelagic ecosystem types aligns more closely with global ecosystem classification approaches.

The descriptions for the 13 new pelagic ecosystem types were drawn from Sink et al. (2011) and

Roberson et al. (2017). They stem from unique environmental habitats estimated by a hierarchical cluster analysis of sea surface temperature, chlorophyll-a, net primary productivity, mean sea level anomalies, and seabed slope and depth data (Roberson et al. 2017), while names for the resultant groups were developed in 2022.

On the shelf, where substantial influence and connectivity exists between the seafloor and waters above it, a single layer representing benthic-pelagic ecosystem types was retained. The new map therefore consists of a shelf area (below about

500 m depth), with a single benthopelagic layer of ecosystems, and an 'off-shelf' deepsea area, where the two ecosystem layers (benthic and pelagic) are overlaid. The 2018 National Biodiversity Assessment considered 150 benthopelagic ecosystem types. These have increased to 163 marine ecosystem types, of which 129 are benthopelagic (on the shelf), 21 are benthic and 13 are pelagic. A new field (Benthic_pelagic) was introduced to guide users as to whether they should consider a single benthopelagic or two (benthic and pelagic) ecosystem layers in their area of interest.

None of the names of the retained (benthopelagic and benthic) ecosystem types changed in 2022. Of those original 150 ecosystem type descriptions, 79 were updated. Most of these updates related to the introduction of a functional ecosystem type description. The most significant changes were in the assignment of some deep shelf-edge ecosystem types to the shelf rather than the slope (notably in the Delagoa and Natal Deep Shelf Edge). Minor edits were made to improve accuracy, clarity and consistency in content and terminology and to improve alignment with the IUCN global ecosystem typology.

In the marine realm, South Africa's

2018 classification and map was a nested hierarchy that first considered 6 Ecoregions, 9 Bathyreions (by adding depth zones), with further subdivision to consider 54 major features and substratum types at the third level. The 54 level 3 sub-units were termed 'Substratum types' and this category has been renamed to 'Biogeographic Ecotypes' in 2022, a category defined in the IUCN typology that aids alignment of South Africa's ecosystem types with the IUCN approach in future iterations. The IUCN typology accommodates both a top down and bottom up classification approach and South Africa is engaging with both approaches. In the top-down approach, the IUCN typology divides the marine realm into 'biomes' of shore, shelf, pelagic and deep-sea benthic types. South Africa's revised classification aligns with this although shelf-breaching submarine canyons span the shelf and deepsea. The second IUCN level is that of Ecosystem Functional Groups, which are similar to the broad ecosystem groups that SANBI used to report ecosystem statistics in the 2018 NBA. In 2022, 16 Ecosystem Functional Group types were introduced, of which 14 are recognised by the IUCN system. The Biogeographic Ecotypes

(inherited from the previous 'Substratum' level and described in the IUCN system as biogeographic variants of the Ecosystem Functional Groups) have clear and logical links to the Ecosystem Functional Groups. The 2022 ecosystem map updated names for 2 of these 54 former Substratum types. In addition, minor errors in the classification were addressed, such as the correction of a wrongly assigned shore polygon in the Delagoa Ecoregion.

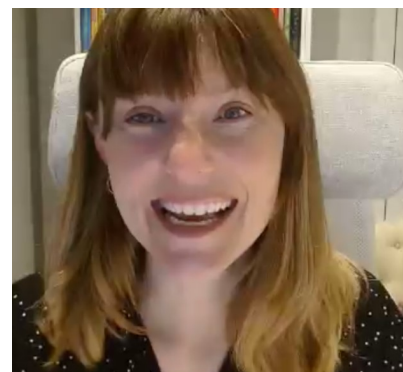
The 2022 version of the map can be accessed [at this link](#). We ask the community to please report any concerns, errors or ideas for future improvement by [getting in touch with the authors](#). Work is already commencing for the next edition of the ecosystem map, in collaboration with the FBIP-funded [SeaMap project](#), which is due for completion at the end of 2024. The objectives for the next version of the map include substantial updates to data underpinning the classification approach and to emphasize robust, transparent and reproducible workflows. We appeal to the marine science community to support those efforts with their environmental and biodiversity knowledge and datasets and encourage interested researchers to join relevant task teams of the Marine Ecosystem Committee. ☞

Marine and Coastal Educators Network Conference on communicating climate change impacts

The Marine and Coastal Educators Network (MCEN) conference is held annually to assist marine educators in their activities, facilitate collaboration between educators, help co-ordinate national marine education initiatives and to identify future opportunities for marine education. This year's annual conference was held online during 28-30 March 2022 and hosted by the Gauteng Regional Representative at South African National Biodiversity Institute (SANBI) National Zoological Garden and South Africa Agency for Science and Technology Advancement led by Armstrong Mashakeni. The conference brought

together informal educators from public aquariums, non-profit NGOs, government agencies and research institutions.

The keynote talks were focused on climate change, with Drs Carl van der Lingen and Steve Lamberth, Specialist Scientists at Department of Forestry, Fisheries and the Environment, discussing the impact of climate change on marine fisheries. Prof Nikki James, Senior Scientist at the South African Institute for Aquatic Biodiversity, presented on climate change effects on estuaries and associated fish. Sam Beckbessinger, Writer



Sam Beckbessinger presented "Survive the Century", an interactive story-game she created in collaboration with a scientific advisory team led by Drs Christopher Trisos and Simon Nicholson.

and Entrepreneur, demonstrated and presented " [Survive the Century](#): Using games to talk about the climate." This interactive story-game was created with a scientific

Why we do it?

African penguin

Spheniscus demersus

Listed as **Endangered** by the IUCN (since 2010)

Fewer than 15 500 breeding pairs in the world

Approximately 10 000 breeding pairs in South Africa and 5 500 in Namibia

Only ~2.5% of the historic population are left





Education supervisor, Sharnay Wagner, introduced SANCCOB's new environmental lessons which focuses on climate change and shared hands-on activities created to boost the learners experience.



Sharnay Wagner

Education supervisor, Sharnay Wagner, introduced SANCCOB's new environmental lessons which focuses on climate change and shared hands-on activities created to boost the learners experience.

advisory team.

The conference was attended by over 70 environmental education professionals and aimed to exchange information on their outreach programmes and activity classroom demonstrations. Conference presenters included, amongst others, the SANBI NZG educators shared their latest programmes and science clubs. Caitlin Ransom showcased the [SAEON Marine Science Education online platform](#). It provides an interactive environment (using visuals and games) to learn about different marine science careers and South African marine biodiversity. It is mainly aimed at

high school kids, although parts are also appropriate for younger kids and the general public.

Philippa Lascelles from the Sustainable Seas Trust (SST) introduced the [Munch on the Move](#) education programme which aims to measurably reduce plastic pollution on school grounds around Africa. This is achieved by assessing the abundance and accumulation rates of plastic litter in schools, as well as monitoring changes over time. Munch on the Move provides support to schools to develop a recycling programme that enables the school to gain a small income stream and remove

recyclables from environments where there may not be access to municipal services. SST provides a wire recycling deposit that assists to educator learners/educators to practically learn about sorting and identifying recyclables. Age-appropriate and curriculum aligned resources are provided.

The next MCEN conference will take place in January 2023 and will be hosted by the Eastern Cape Representatives of MCEN led by Nozi Hambaze, Science Engagement Officer at the SAEON Elwandle Node.

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Created by SST, Munch, is a large wire-work coelacanth fish and a recycling deposit that is moved around schools to help collect and sort waste at source before it ends up in the ocean.

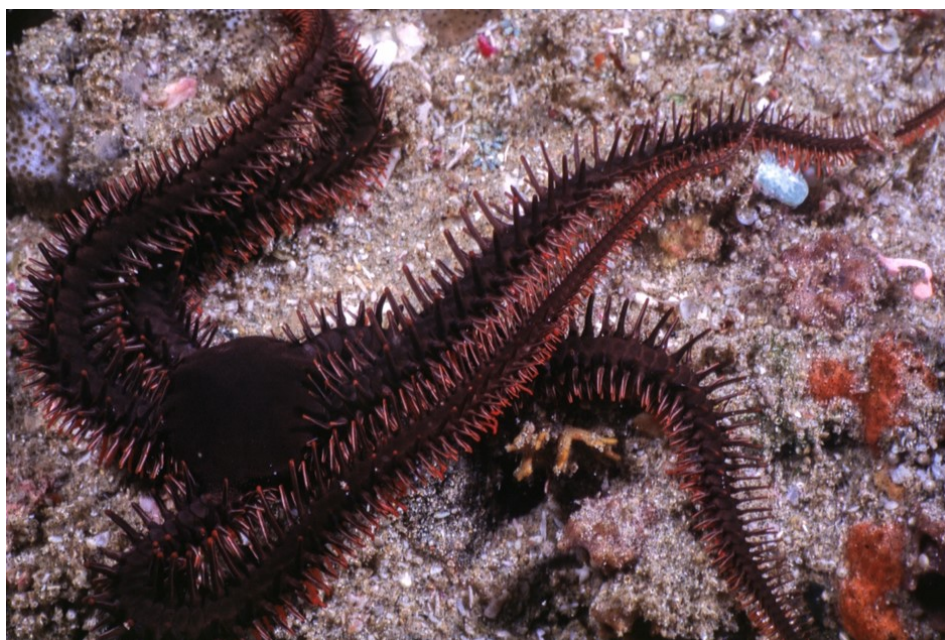
The journal Abc Taxa presents the first comprehensive review of South African ophiuroids in over four decades

By
Yves Samyn

*Royal Belgian Institute of
Natural Sciences*

Climate change and global warming are terms that nowadays resonate nearly daily through the media. This comes as no surprise as it affects human society directly. However, the causes behind these changing patterns are seldom adequately explained. True, emission of greenhouse gasses and loss of forests and coral reefs are evoked as sources of the problem. The role of biodiversity as harmonizing and molding factor in ecosystem well-being and functioning however fares less-well in popular communication. Why? Is it a too complex phenomenon to explain to the lay-person? We wouldn't think so given it takes little understanding to grasp that we directly depend on ecosystem services. Think of pollination, water quality, air purity, etc.

But, even in 2019, we still know little about our biodiversity. For



Ophiocoma erinaceus Müller & Troschel, 1842. An ubiquitous brittle star in the shallow-waters of KwaZulu-Natal.

instance, of the estimated 10 to 30 million species that populate Earth, only some 2 million or so have so far been (validly) named, and less than 20,000 new species are described annually. These are surprisingly low numbers given the richness of detection, identification and classification techniques that we now possess. Clearly taxonomic productivity needs to be boosted, especially in megadiverse countries and on taxa with important ecosystem functions, such as South African ophiuroids.

Ophiuroids (brittle and basket stars) are one of the five extant

classes of echinoderms (the others being the starfish or Asteroidea, the sea urchins or Echinoidea, the feather stars or Crinoidea and the sea cucumbers or Holothuroidea). Ophiuroids often constitute a large part of benthic marine communities and can contribute significantly to the local biomass. Moreover, their feeding and often cryptic behaviour can also have large quantitative (e.g. the amount of water filtered) and qualitative (e.g. change in the biochemical composition of the benthos) effects on the ecosystem. However, in order to objectively assess the role and functioning of

ophiuroids in ecosystems, we primordially need to know what taxa live where and in what abundance. Providing this information is one of the tasks of the taxonomist.

Unfortunately, basic taxonomic information is lacking in many parts of the world, not in the least for ophiuroids which often escape taxonomic investigation. Such was partly the case in relatively well-studied South Africa where the last comprehensive review of ophiuroid biodiversity was made over four decades ago.

In the 19th issue of *Abc Taxa* (www.abctaxa.be), the capacity building journal of the Belgian Global Taxonomy Initiative, Olbers *et al* (2019) rectify this situation. After a solid introduction into the taxonomic characters (including their respective states) and sampling practices this book gives a taxonomic account of the ophiuroid diversity found in the Exclusive Economic Zone of South Africa. In doing so, it forms a trustworthy basis for further taxonomic studies on ophiuroids in South Africa and beyond. The knowledge assembled in this book will lead to a better understanding of South Africa's marine biodiversity and will help in drawing much

needed conservation plans that are fenced by trustworthy biodiversity data.

Hard copies of this volume are distributed free of charge to local networks identified by the authors and the Belgian Global Taxonomy National Focal Point and through library exchange-systems. Researchers or institutions from developing countries can obtain a free copy of this (or other) volume of *Abc Taxa* when they send a motivated request to the editorial office of *Abc Taxa* (abctaxa@naturalsciences.be). For the interested public of non-developing countries, copies are charged at printing, handling and distribution cost. Prices are indicated on the journal's website (www.abctaxa.be).

Soft copies are freely available on the journal's [website](#).

Journal reference:

Olbers, J.M., Griffiths, C.L., O'Hara, T.D. & Samyn, Y. 2019. Field guide to the brittle and basket stars (Echinodermata: Ophiuroidea) of South Africa. *Abc Taxa* 19: 1-346.

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Educator empowerment in the Knysna Basin Project

Teachers who have knowledge of a topic teach with confidence and, conversely, are not confident in their teaching with content which they are not familiar. In South Africa, education research has shown that unfamiliarity in environmental content knowledge is a problem as for many teachers this content is new (having not been exposed to it in the previous schooling and tertiary education systems).

To take this one step further, international studies have shown that: "Concurrent with the need to understanding the complex content, is establishing pedagogies that support the designing of teaching and learning in an interactive, learner-centered way..." (Unesco 2014). That is, the methods of teaching affect the way in which the content is understood and learnt.

To address these issues in the Knysna area, the Knysna Basin Project initiated their Educator Empowerment Project. They engaged Environment Learning & Teaching (EnviroLearn) to conduct two [Fundisa for Change courses](#). The Fundisa courses focus on content knowledge, pedagogical and assessment practices, thus facilitating effective teaching processes. This project was funded by The Table Mountain Fund.

Source:

Seath, J. (2022, March 23). [Educator Empowerment Project - Knysna Basin Project](#). ✂

ATAP Anecdotes: Fine-tuning the movement patterns of the giant guitarfish

By
Bruce Mann and
Stuart Dunlop

*Oceanographic Research
Institute*

Due to the charismatic nature of many large shark species such as great whites, tigers, bulls and whale sharks, they have received much attention over the years, and for this reason are relatively well studied. Unfortunately, this trend has left many lower priority species of sharks, skates and rays relatively understudied. In some circumstances, as was the case with the sawfishes, they are the species that are at the highest risk of extinction and require urgent management attention.

Guitarfishes, also known as sandsharks or wedgefishes, share a body form somewhere between a musical instrument and a shark, are a unique family of rays comprising of 55 species found in most oceans. Unfortunately, they have been identified as being one of the most vulnerable families of cartilaginous



Stuart Dunlop, about to release a tagged giant guitarfish (Photo: Jade Maggs)

fish in the world. This is primarily due to their highly prized fins which are used in the Asian shark-fin soup trade. Despite guitarfishes being of significant importance to this and other fisheries around the world, there is a paucity of information on their movement behaviour, reproductive biology, nursery areas, breeding areas, age and growth.

A few years ago the Oceanographic Research Institute (ORI) identified the need for further research on these species and in 2016, in collaboration with the Acoustic Tracking Array Platform (ATAP), Save our Seas Foundation (SOSF) and the KwaZulu-Natal Sharks

Board (KZNSB), they started a project tracking the movements of giant guitarfish (*Rhynchobatus djiddensis*) along the east coast of South Africa using acoustic tags/transmitters. Each tag, which is inserted into the abdominal cavity of the fish, emits a unique signal with a date and time stamp that is detected by receivers that are moored to the seafloor at various localities along the coast. Unlike conventional mark-recapture studies, the use of acoustic telemetry allows scientists to collect continuous data on the spatial and temporal movement of fish, which is vital for successful conservation and management of a species.



A large haul of giant guitarfish carcasses seized from an illegal fishing vessel operating off southern Mozambique. (Photo: KwaZulu-Natal Sharks Board).

To date the project has been very successful with the tag and release of 19 giant guitarfish including seven males and eight females, ranging in length from 1220 mm Total Length (TL) to 2770 mm TL. Of the 19 individuals tagged, nine have been detected at various receivers stationed along the KwaZulu-Natal and southern Mozambique coast. Six of these individuals have shown fairly localised movement (< 50 km) to date and have remained within the general vicinity of where they were originally tagged. However, the other three individuals showed substantial movements covering 100s of kilometres. Interestingly,

the smaller individuals (1370-1950 mm TL) including three males and three females showed limited movement, while the larger individuals (1690-2770 mm TL), including one male and two females, showed greater movements. There was some evidence of seasonality with the larger individuals tending to move north in winter and south in summer. The largest female tagged (2770 mm TL), was detected just over 16 hours after of the tagging event and four days later she had moved approximately 100 km in a north-easterly direction and was detected off Ponto do Ouro in

southern Mozambique. Such a find is concerning as guitarfishes are heavily exploited in Mozambique for their fins. Longshore movement of adults into Mozambique could therefore explain why the population numbers of this species have decreased in South African waters.

A second large female (2060 mm TL) moved approximately 250 km from the original tagging site at Nonoti to Sodwana Bay between March and July 2017. She remained in the iSimangaliso Wetland Park for three months before returning to Tinley Manor in November 2017. She stayed in this area until the end of March 2018 and then again moved back to the Park and was recorded off Leven Point in July 2018. During her second visit to the Park she was recorded on receivers placed in the deep water canyons off Leven Point and Leadsman Shoal indicating that she undertook forays into deeper water.

Only one male has shown extensive movement up and down the coast between Ifafa and Richards Bay, sometimes at a considerable speed. In two and a half years this male has moved over 650 km, with an average speed of 1.3 km per day.

Given the susceptibility of this species to capture by multiple gear types, the known heavy fishing pressure from local and foreign vessels in parts of its range (Tanzania, Kenya and Mozambique) and the limited information on its life history, it is paramount that further research be conducted on this vulnerable species. By passively tracking various individuals from the population using acoustic tags it is hoped that the movement behaviour of the giant guitarfish will become better understood, and that the data will be used to implement/identify suitable management strategies going forward. This is particularly important if individuals are indeed migrating to Mozambican waters, in which case transboundary management strategies will need to be considered. ↗

ORI produces interactive maps and videos to help users and managers understand the KZN Marine Protected Area regulations

The Oceanographic Research Institute (ORI) has worked with the managers, fishermen and divers of KwaZulu-Natal (KZN) for over 50 years. This relationship has helped to ensure that some iconic fish species, such as shad and seventy-four are still around today, and that the province's marine biodiversity has been protected in a number of marine protected areas (MPAs).

On the 23 May 2019 the South African Government declared four new or expanded MPAs in KZN. The zonation of these MPAs is fairly complex and some managers, fishermen and divers have found the regulations difficult to understand. For this reason ORI has produced two resources to help managers and resource users

understand the zonation of the MPAs in KZN.

A downloadable interactive map for use on Google Earth or Google Maps. This georeferenced map will allow you to navigate around each MPA and provides a summary of the zonation and the regulations relevant to each zone. The information in this map is based on Government Gazette No. 42479. The maps provide a simple summary of the most important regulations.

A series of 4 videos in which Dr Bruce Mann, ORI Senior Scientist, explains the zonation for each MPA.

To download and use these resources, have a look at our [SAAMBR website](#). ↗



Watching the urban Swartkops Estuary change under COVID-19 lockdown: biologists and conservationists reflect on positive ecosystem responses

By

¹Nadine Strydom, ¹Carla Dodd, ¹Janine Adams, ¹Daniel Lemley, ²Jenny Rump & ²Dale Clayton

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&

²Zwartkops Conservancy

The global COVID-19 outbreak was declared a pandemic by the World Health Organisation (WHO) in early March 2020 following which, President Cyril Ramaphosa declared a state of disaster in response to rising cases in South Africa. The ensuing, unprecedented national lockdown on the 26th of March restricted all South Africans to their homes while only essential services were allowed to operate.

Globally, with travel restrictions in place, decreased human activity and pollution has declined markedly with an observation-based, ecosystem recovery response in many popular tourist destinations. This has been reported from aquatic habitats such as the canals in Venice, Italy that have remarkably improved in water quality to increased wildlife activity in urban habitats such as wildlife roaming city streets worldwide and

the 25% increase of migrating flamingos to Mumbai, India). In South Africa, scientists, conservation organisations and the public are slowly reporting changes in local ecosystems. The urban Swartkops Estuary in Algoa Bay is under the watchful eye of residents and the ecosystem is showing positive changes in the absence of human traffic.

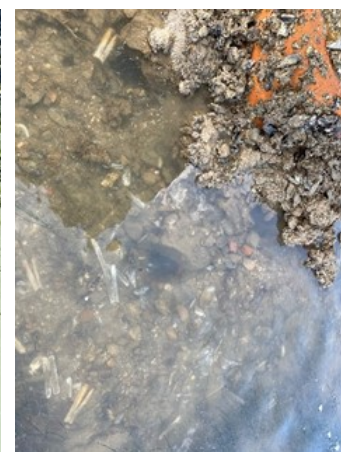
Residents have reported increased bird activity that is visible from residential properties. Cormorants, egrets, spoonbills, sacred ibis and gulls can be seen feeding at on the mud flats and in the shallow waters of Tippers Creek, in closer proximity to Amsterdamhoek Road. It appears that the birds are responding to the lower vehicle and human disturbance levels in the



Mullet shoaling in the shallows of Swartkops Estuary.



Bloodworm mounds in Tippers Creek at Swartkops Estuary.



Octopus in a seagrass bed (left) and visible prey rubble (right).

area. The absence of subsistence and recreational fishing together with no boating activity in the lower Swartkops Estuary has resulted in an observed increase in visible fish feeding activity in Tippers Creek (pers. ob. resident biologist Prof Nadine Strydom). More mullet and grunter have been seen shoaling and tailing on the incoming tide. These species are usually heavily targeted for live bait and consumption respectively.

Although not yet measurable, the decline in boating activity and clearer water would improve the growth and expansion of the keystone seagrass species, *Zostera capensis*, which is an endangered species.

With the absence of anglers, bait harvesting activities have stopped. This has been evidenced by the remarkable recovery of blood worm *Arenicola loveni* populations, characterised by their typical mounds now in abundance on sand banks in Tippers Creek.

In the absence of bait collection, octopus activity has increased in Tippers Creek. The activity has even resulted in changes to benthic habitat with octopus prey rubble accumulating at the numerous dens

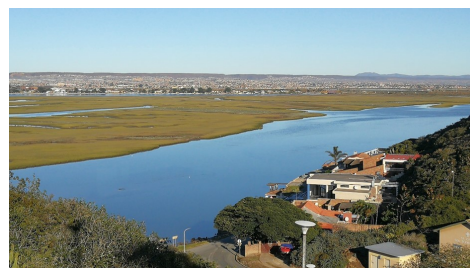
along the margins in Tippers Creek. Octopuses are also readily seen hunting in the daytime along the edges of the seagrass beds, retreating to their dens during the flooding tides where they ambush passing fishes. Rubble consists of harvested molluscs as prey and ranges from black mussels to pencil bait. Shells and rocks are gathered around dens by the octopuses and with more around, this feeding and den activity is converting barren sandy areas into rubble areas that provides additional refuge for other estuarine creatures essentially creating new habitat.

We remain cautious when these changes are attributed to lockdown regulations as science should be practiced with rigor and longer-term data collection. For example, the perceived increases in bird activity may be due to annual bird population fluctuations as summer migrants (waders) depart and winter residents (cormorants, spoonbills, egrets) move into estuaries. Furthermore, sightings may be subjective as Swartkops residents have more time to observe the habits of their animal neighbours. However, there is much to be said about the 'trained eyes' of biologists, conservation organisation members and nature

lovers living on an urban ecosystem and the power of close observation. Regardless, this period gives rise to food for thought for human use patterns in estuaries, particularly



Still waters in the lower reaches of the Swartkops Estuary.



Lockdown view over the Swartkops Estuary indicating the undisturbed salt marsh areas.



Salt marsh of the Swartkops Estuary.

urban estuaries that are subject to excessive human use and resource extraction in the form of bait and fishes and questions can be asked. Should portions of the estuary be closed to extractive fishing or should seasonal closures to recreational fishing and bait digging be implemented to allow for more spawning and the conservation of nursery habitats? Seasonal or sectional closures mean more fish and more bait for the future as it allows a 'breathing period' for animals to reproduce uninterrupted.

Ongoing concerns regarding the health of the estuary include the persistent poor water quality from household grey water, polluted water from industrial areas and wastewater treatment works that continue to contribute to the deterioration of the estuary despite lockdown. During lockdown, officials could not attend efficiently to leaks and spills due to skeleton staff and these water quality issues persist in the river and estuary.

Lockdown conditions however give cause for optimism as we observe the resilience of natural habitats and the speed with which recovery is possible if action is taken and anthropogenic pressures decreased.

∅

Explore the Shore with Prof Charles Griffiths

Emeritus Prof Charles Griffiths and his son, Matthew Griffiths, have produced a [series of educational videos](#) about the local seashore on YouTube. Join them as they explore the diverse hidden world on our rocky shores. From starfish to barnacles, sea slugs to octopus, they investigate the creatures and features of our coastlines.

Charles has spent his life teaching marine biology at the University of Cape Town and is an expert on South African coastal marine biology with a career spanning over

50 years. Matthew is a filmmaker and artist in multiple mediums.

By creating this series they hope to engender an appreciation and love of marine life amongst the South African public, and a global appreciation for the unique African shoreline and kelp forest. They aim to motivate the public to respect and conserve marine organisms and to care for the coastline and the organisms that live there. The show also contributes to formal education in the fields of Life Sciences and especially Maritime Studies. ∅



Charles and Matthew Griffiths have created *Explore the Shore*, a YouTube show comprised of 3-10 minute episodes, each exploring amazing animals and features of our coastline.

New appointments



Thomas Mtontsi was elected Chairperson of the Marine and Coastal Educators Network (MCEN). Thomas is a Science Engagement Officer at the SAEON Egagasini Node. Thomas is passionate

about the environment and has extensive experience in marine science education. Outgoing MCEN Chairperson, Phumeza is thanked for her dedication and support of activities.

Dinah Mukhari was elected SANCOR Student Representative at SAMSS.

She is a first year PhD student at Rhodes University. Her research is focused on understanding the anthropogenic barriers to fish migration. Outgoing SANCOR



Student Representative, Sinegugu Banda is thanked for her enthusiastic service during her term.

A warm welcome is extended to both Dinah and Thomas and they are wished every success in their new roles!

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Our Focus: Science in the Marine and Coastal Environments

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