

THE ORICLE

Newsletter of the Oceanographic Research Institute



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ORI EXTENDS ITS REACH

The Oceanographic Research Institute recently extended its research initiatives in the Western Indian Ocean to the Arabian Sea coast of Oman, at the northernmost geographical extreme of this region.

More than 7,000km north of KwaZulu-Natal, the marine environment and species of the Arabian Sea show many surprising similarities to southern Mozambican and KwaZulu-Natal coastal waters and biota. There are several probable reasons for this.

Geographically, the Arabian Sea lies equidistant from the equator (17-23° N) when compared with southern Mozambique (17-27°S), with similar warm subtropical waters which are influenced by strong offshore Somali and Agulhas Currents respectively.

The Arabian Sea coastline of Oman has few sheltered bays, large mudbanks reminiscent of the Thukela and Sofala Banks, a strong seasonal upwelling cell and high productivity centres, and a number of offshore islands, comparable to the Bazaruto Archipelago.

The Arabian Sea has a high biodiversity and shares many Indo-West Pacific species with Mozambique and KZN, several of which appear to be much scarcer or even absent in the lower equatorial latitudes between the Arabian Sea and the SE African coastal waters.

Although Oman is not a participant in the SWIOFP and ASCLME projects in which ORI is heavily involved, it does form the northern boundary of the Somali Current Large Marine Ecosystem, which makes it relevant to the both the SWIOFP and ASCLME projects.

The coastal region of Oman is heavily fished, mainly by motorized dhows and artisanal fishers using small craft with outboard engines (40-80hp), with nets, traps and lines. Catches are dominated by demersal species (snappers, seabreams, groupers, croakers, ribbon fish), small and medium pelagic species (sardines, mullets, mackerels), several tuna species, cuttlefish and spiny lobsters and even an endemic abalone species.

In 2007, the Ministry of Fisheries Wealth in Oman contracted a New Zealand survey vessel and scientists from NIWA (National Institute of Water and Atmospheric Research, New Zealand) to survey their 1,000 km long

Arabian Sea coast from Ras Al-Had to the Yemen border (see map on Page 3).

The survey would extend over more than a year, cover the 20-250m depth stratum to provide estimates of fishable biomass of principal demersal and small pelagic species for ongoing stock assessments, and guide fisheries development and investment decisions.

In August and September 2008, ORI's Johan Groeneveld was invited to assist NIWA and Omani scientists on-board the survey vessel, *Al-Mustaqila*, for a seven-week survey.

The survey started somewhat inauspiciously when, on its very first trawl, the survey vessel was attacked

by a fleet of more than 20 small craft. Fortunately the *Al-Mustaqila* (a 45m steel research trawler with GRT of 1,200 t) was relatively immune to the barrage of rocks hurled by local fishers intent on chasing an 'illegal trawler' from their fishing grounds. Having cleared up the misunderstanding through the intervention of the navy and police, the survey proceeded smoothly with demersal trawls of 20 minutes each (ca. 2 nautical miles) during daytime and midwater acoustics tracks and trawls at night.

The survey was randomly stratified by depth and latitude, and apart from the demersal and pelagic trawls, and acoustic tracks, a host of other sampling techniques were also used, including underwater video drops, setting of traps on untrawlable areas, CTD casts, phyto- and zooplankton sampling, mesopelagic midwater trawls, deepwater exploratory trawls to >1000m depth, whale and dolphin sightings, and collections of biological information, specimens and otoliths for further study.

From all trawl stations, more than 400 different species or species groups were recorded during the survey; one specific trawl had 65 different species. It is noteworthy that catches were consistently small, except in the shallowest stratum (20-50m) where large catches of up to 8 tonnes per 20-minute trawl were sometimes recorded.

An oxygen depleted zone below approx 50-100m depth tended to restrict catches deeper than 50m to smaller



Survey vessel, *Al-Mustaqila* (above)

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SHARK RESEARCH ASSISTANT HONOURED ... AGAIN

There's a new species of shark in South Africa's waters – the *Haploblepharus kistnasamyi* – named after the man who discovered it, Nat Kistnasamy.

The 71-year-old retired shark research assistant, who first identified this catshark almost 30 years ago, had the rare species recently named after him by South African Museum researchers Brett Human and Leonard Compagno. They decided to call the shark the *Haploblepharus kistnasamyi* after a detailed study confirmed it to be a new species.

Nat, who worked for ORI for 46 years, spotted the species while categorizing sharks using specimens from their bodies. "When I worked with the catshark, I told others of the research team that I was doubtful of this shark being the same species as the rest in the sample. They investigated, and it was found to be a new species," he said. "I am elated and honoured about having the shark named after me. This pays for all the hard work. This name will stay forever – it's a legacy for my grandchildren," he said.

Originally trained as an electrician, Nat was offered a job by the late Dr David Davies as an assistant in the ORI shark research programme, at a time when he could not find work in his field. He soon discovered he had a passion for marine life and became a recognised expert in the identification of sharks.

Besides being co-author on many outstanding scientific papers, Nat's work was also recognised when he was awarded the prestigious Derek Krige Medal in recognition for technical excellence in marine science.

During his days at ORI, Nat was involved in detailed measuring of sharks as a basis for their identification and taxonomy. He also assisted in the shark tagging activities which became one of the more challenging and dangerous parts of his job when tagging Zambezi sharks. Nat excelled at making models of sharks and other organisms – many still to be found in many school classrooms.

Mark Penning, Director of SAAMBR, said Nat's pioneering work earned him worldwide acclaim, adding that his

illustrations have been used by scientists around the world. "Nat used anatomical knowledge to develop a range of fibre-glass models depicting various marine animals. These wonderful true-to-life models have been used to inspire the thousands of school learners that visit our Education Centre," he said. "We are delighted that Nat's efforts and expertise have been recognized by having a shark named after him," he said.

Catsharks are small and beautifully patterned sharks that live on the seabed, some at considerable depths, and reproduction is oviparous, involving the production of egg cases. At least 14 species occur in South African waters, many endemic, including *H. kistnasamyi*. This type of catshark is also called a shyshark as it has a habit of curling up after capture, covering its eyes with its tail. Recently, industrial fishing has targeted catsharks in great numbers for oil and fins, placing some stocks in jeopardy.

Not long after the shark was newly named, Bruce Mann and his team caught an "unusual" catshark during a Pondoland MPA survey. Asked to verify its identity, Phil Heemstra of the South African Institute for Aquatic Biodiversity confirmed that it was indeed *Haploblepharus kistnasamyi*. How's that for a coincidence!



Nat Kistnasamy with one of his educational displays

ECOSYSTEM SERVICES FOR POVERTY ALLEVIATION

It is increasingly noted that some of the most beautiful coastlines, stocked with rich resources and many fine tourist attractions, are also the zones of greatest poverty and marginalised communities.

Waving palm trees and azure waters often belie the underlying problems that beset the people of that region. How is it that amid these picture-perfect settings, the benefits of coastal and marine goods and services do not contribute more to poverty alleviation?

These concerns formed part of the basis of a multi-institutional study which investigated ecosystem services as a basis for poverty alleviation. The study was led by the Overseas Development Group of the University of East Anglia, together with six other institutes from the Far East and Africa – including ORI. Case studies from Vietnam, Philippines, Kenya and Mozambique were subjected to the Millennium Ecosystem Assessment approach, revealing some important common facts.

Generally, the poor are seen to receive a disproportionate share of benefits from coastal and marine ecosystem. In most cases they have little overall impact on changes in ecosystem services, although specific hotspots of degradation can be attributed to poor stakeholders. Poor people tend to focus on the provisioning benefits such as food and cash, while the role of the important regulating benefits, such as waste assimilation and climate regulation, are often not adequately factored in, even though they contribute to human well-being.

It also emerged that there were many assumptions and inconsistencies in the available literature that tended to divert attention away from the core underlying issues and that this compromised good governance of this important issue.

The results will be formally published and are expected to inform and guide future policy direction and funding support from the British Department of International Development (DFID).

KZN PROVINCIAL RESEARCH PLANS FOR 2009

Around the middle of each year the ORI scientists plan in detail for the next year's research programme. This involves a number of activities and procedures, much in collaboration with management agencies, especially Ezemvelo KZN Wildlife.

Project proposals are designed to meet urgent environmental needs before being subjected to a peer review panel and then submitted to Marine and Coastal Management (MCM) for final evaluation and funding. In addition to this process, long-term monitoring projects, regional programmes, student projects and selected consultancy tasks make up the overall 2009/10 work programme.

Although the six KwaZulu-Natal projects proposed by ORI were highly rated by the review panel, MCM was unable to find the funds, so that KZN marine research will be severely restricted in 2009.

The KZN long-term monitoring programmes are also under some threat of non-funding, including some that have major management decision-support implications. Fortunately, ORI does receive some support from the KZN Department of Agriculture and Environmental Affairs which helps not only with coastal zone research but also assists in retaining research capacity in KZN in the light of dwindling national support.

Some KZN projects will continue. A comprehensive survey of fishers, establishing key fishing and attitude patterns, was carried over from last year and is now in full swing. This intense year-long study follows on from a similar project conducted a decade ago and should

provide valuable insight into a number of environmental and fisher trends.

The research relating to the health of the St Lucia system under different climate regimes will also continue, leading to an assessment of the ecological health and functioning of the lakes and estuary by monitoring macrobenthos community changes through various climatic conditions.

National Research Foundation (NRF) support for modelling of East Coast reefs, especially coral reefs, is to be intensified with modelling ecological reef processes and connectivity within the context of climatic and environmental change being a main feature this year.

An exciting and challenging new programme is the NRF/ACEP supported Thukela Bank functioning study. This muddy, offshore ecosystem forms a unique habitat on the South African coast, and harbours its only commercial shallow-water prawn fishery. The Bank also hosts a distinctive community of demersal fauna whose lives are thought to be greatly influenced by the adjacent Thukela River. Understanding the functioning of this ecosystem will assist KZN in wise management approaches and contribute to sustainable use of resources. Besides the biotic components, physical aspects of water quality and oceanography are intimately woven into this multi-disciplinary study.

We are clearly most disappointed at the lack of national funding support for local projects and the limitation this places on our ability to work intensively in KwaZulu-Natal. Thankfully ORI is involved in several larger regional programmes, such as SWIOFP, which will help to retain our research momentum for 2009/10.

ORI EXTENDS IT REACH

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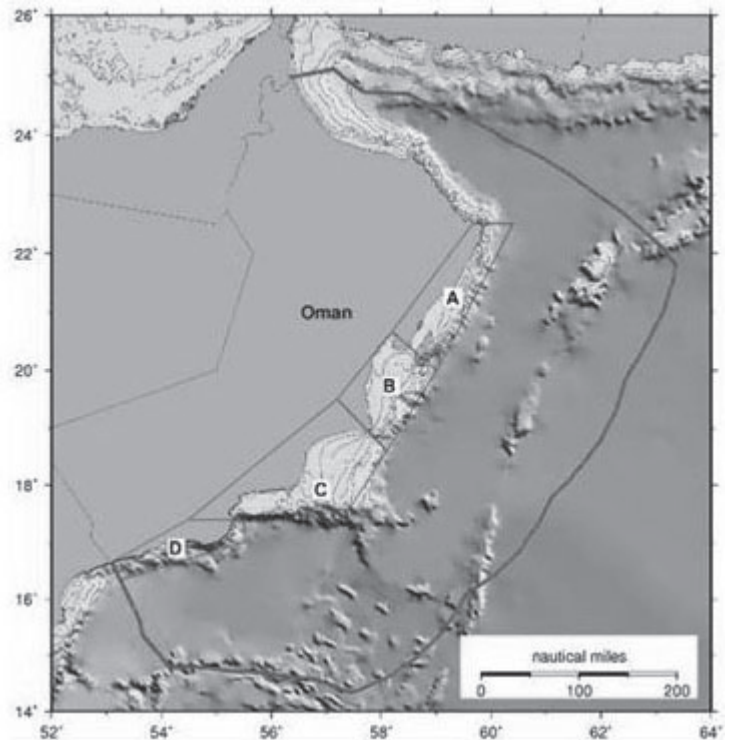
fishes (threadfin seabreams, gurnards, spiny flatheads, lizard fishes) and a lower species diversity, albeit sometimes numbers were large.

Large catches of spotted grunter (*Pomadasys commersonnii*), blue emperor (*Lethrinus nebulosus*), king soldierbreem (*Argyrops spinifer*), santer seabream (*Cheimerus nufar*) and various groupers (*Epinepelus* spp) were made in shallow waters, most impressively a single 4 tonne haul of spotted grunter. All these species are also well-known to fishers in KZN, where some of them make up part of catches by commercial and recreational skiboat fishers.

Sharks and rays were plentiful in trawl catches, several of them apparently species new to science. Significant quantities of cuttlefish (*Sepia* spp.) were caught and deep-water whip-lobsters (*Puerulus sewelli*) were for the first time caught off Oman at ca 450m depth.

The data collected during the survey were of the highest quality throughout, and contrary to popular belief in South African rugby circles, the New Zealanders were actually quite human and a great bunch of guys to work with!

On a scientific level, ORI has made overtures to the Marine Science and Fisheries Centre in Muscat, Oman, to strengthen collaborative research projects on commercially fished species that are important to both countries. A first obvious question would be whether these demersal fish populations, which are separated by the entire WIO basin, belong to a single population, or whether the northern and southern populations have become genetically distinct.



This map (above) shows the area which was surveyed

Similar biological research projects are being done at both institutes, and collaborative projects will most likely be mutually advantageous, especially in the light of the South West Indian Ocean Fisheries Project now underway.

STUDENT CORNER

ORI contributes substantially to coastal and marine capacity building and student training in KwaZulu-Natal.

Each year ORI staff provide fisheries science training to BSc Honours students and take on a number of post-graduate students. These students are mostly registered through the University of KwaZulu-Natal in terms of our long-standing relationship and MOU with the University.

Over the years more than 100 post-graduates have been trained at ORI, many of them today occupying responsible positions in South Africa and around the world.

This year we have eight students registered with several more developing their proposals for future registration.

Studentships at ORI involve more than just study. Each student is expected to deliver a service to the Institute, in return for which the student gains considerable practical experience of working within a formal research institute environment. This experience often stands the student in good stead when applying for later employment.

The registered students are listed below.

STUDENT	TOPIC/PROGRAMME	DEGREE STATUS	ORI SUPERVISOR
Angus Macdonald	Coral genetics	Final year PhD	Michael Schleyer
Darryl Colenbrander	Coastal zone	Final year MSc	Louis Celliers
Camilla Floros	Coral reef health and fishes	Final year PhD	Michael Schleyer
Catherine Stow	Estuarine health	2nd year MSc	Fiona Mackay
Stuart Dunlop	Angler surveys	1st year MSc	Bruce Mann
Ashley Grimmer	Reef processes	1st year MSc	Michael Schleyer
Justin Hart	Reef processes	1st year MSc	Michael Schleyer
Phanor Montoya-Maya	Coral recruitment	1st year PhD	Michael Schleyer

MYTHICAL OARFISH

The diversity of marine life off the coast of KwaZulu-Natal is enormous. Nowhere is this more evident than when unusual species are brought in to ORI for identification.

Recently, Sean Fennessy received a call from the captain of the trawler *Elizé*, to inspect an unusual catch. Unusual indeed as it proved to be a 4m long oarfish, one of a family of fishes found in central latitudes in all the world's oceans, at depths of between 20m and 1,000m.

Oarfish are the longest of the bony fishes – some reaching lengths of 12m. The longest cartilaginous fish (sharks and rays) is the whale shark, which also reaches 12m.

This specimen proved to be *Regalecus glesne*. When alive, its head and body are silver with blue and black streaks and numerous spots. The dorsal fin and the prominent crest are on its head are bright crimson.

Oarfish feed on euphausiids (krill), small fishes and squid. Remarkably, the oarfish swims in a head-up, vertical position in the water and legend has it that early sightings of this fish may have contributed to the myths of sea serpents.



Sean Fennessy (above left) and colleagues posing with the unusual oarfish trawled in 400m off the KwaZulu-Natal coast.

SOME RECENT PUBLICATIONS

- EVERETT, B.I. & VAN DER ELST, R.P. 2008. An assessment of the Marine Ornamental Fisheries of KwaZulu-Natal, South Africa from 1990 to 2003. Oceanographic Research Institute, Durban: 10p. (ORI Unpublished Report 269)
- EVERETT, B.I., VAN DER ELST, R.P. & SCHLEYER, M.H. (eds). 2008. A natural history of the Bazaruto Archipelago, Mozambique. Special publication. South African Association for Marine Biological Research (8): 118p
- KRUGER, A., DE BRUYN, P.A., DU TOIT, W. & SCHLEYER, M.H. 2008. Stock assessment and monitoring of sand prawns (*Calinassa kraussi*) in Durban Bay and Port of Richards Bay, and mud prawns (*Upogebia africana*) in the Mgeni Estuary. Oceanographic Research Institute, Durban: 20p. (ORI Unpublished Report 250)
- MAGGS, J.Q. 2009. National marine linefish system: Recreational skiboat catch and effort data for selected locations along the Garden Route: 1985–2007. Oceanographic Research Institute, Durban: 3p. (ORI Data Report 2009/4)
- SCHLEYER, M. 2008. Corals in South Africa. Submerge Magazine series of five articles: April to December 08
- STEYN, E., FIELDING, P.J. and SCHLEYER, M.S. 2008. The artisanal fishery for East Coast rock lobster *Panulirus homarus* along the Wild Coast, South Africa. *African Journal of Marine Science*. Vol 30. No 3: 497-506