

THE ORICLE

Newsletter of the Oceanographic Research Institute



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LIFE ON A MUDDY BOTTOM

Other than on the crustacean trawl grounds, there is little known of the biodiversity of demersal (bottom-associated) fauna on sandy/muddy sediments off KwaZulu-Natal.

The second phase of the African Coelacanth Ecosystem Programme (ACEP) has provided an opportunity to investigate these communities, as part of a multi-disciplinary, multi-institutional study on the ecosystem functioning of the KwaZulu-Natal Bight (see *The Oricle* 54, May 2010).

The Bight is essentially an offset in the otherwise straight coastline, resulting in a widening of the continental shelf, and it stretches from Richards Bay in the north to Durban in the south.

The KZN Bight Ecosystem Functioning project aims to increase understanding of the relative importance of marine and terrestrial nutrients in the Bight, by investigating biodiversity, habitat and food web linkages, and also to establish how these nutrients are recycled by the various ecosystem components, from the bacteria and plankton all the way up to higher predators.

While the *FRS Algoa* collected a range of environmental and biological data in wet and dry season surveys in February and August 2010, ORI's Sean Fennessy, Desmond Hayes and Chris Wilkinson chartered a commercial trawler to collect demersal samples in and around areas of the Bight which are considered to be nutrient focus areas (Durban, Thukela and Richards Bay).

Research trawls were undertaken along transects in water depths starting at around 30m, out to about 560m. Trawl station localities were determined based on a combination of depth strata, shelf width and trawlability.

The deeper trawls proved extremely tricky at times, as the Agulhas Current was flowing at speeds of up to 4 knots off the shelf break. Fortunately, the skipper (Knud Sorenson on the *Ocean Spray*) is known to be the most experienced trawler operator on this coastline, and he succeeded in obtaining samples even under trying circumstances; a small, non-commercial trawl was used to ensure that excessively large catches were not made – in retrospect this was also a good choice because it meant that we could still trawl in currents which would not have permitted use of a full-size commercial trawl.

Over 300 different species of demersal organisms were caught in a total of 40 successful trawls. There was a broad trend of increasing numbers of species and greater numbers of higher taxonomic categories with depth.

Catches were dominated by fishes and crustaceans, with the former more dominant in shallower depths. Crustaceans assumed more importance in depths >400m and in trawls around

300m depth, sponges and echinoderms (sea stars) were much more common.

Amongst the fishes, sand soldiers (*Pagellus natalensis*), olive grunter (*Pomadasyd olivaceum*), small kobs (*Otolithes ruber*, *Johnius spp*), gurnards (*Lepidotrigla sp*) and several soles predominated in shallower trawls, while green-eyes (*Chlorophthalmus sp*) and rat-tails such as *Coelorinchus trunovi* dominated deeper trawls.

Crustaceans were mainly represented by a variety of crab and prawn species at shallower and deeper water, with commercially important species found at depths <50m and from 300-

500m. Many of the less well-known invertebrates will require experts to verify the preliminary identities assigned to them, and it is highly likely that some exciting discoveries will result.

Flesh samples of many of the more common organisms were also collected to provide information on carbon and nitrogen ratios for additional input into the KZN Bight ecosystem functioning model.

Keep an eye out for future *Oricle* articles on this challenging and ambitious project which is generating an enormous amount of new knowledge on our marine environment.

For more information on ACEP and the programme's activities, go to <http://www.saiab.ac.za/index.php?pid=240>.



ORI staff and crew from the *Ocean Spray* waiting expectantly for the research trawl to be hauled on deck

WIOMSA SPEARHEADS REGIONAL CONFERENCE ON CLIMATE CHANGE

In recognition of the potential impact of climate change on the people and their environment, the Western Indian Ocean Marine Science Association (WIOMSA), in collaboration with a number of strategic regional partners, facilitated a conference that developed a Consensus Statement on approaches towards adaptation and mitigation of the impacts of climate change in WIO countries.

The meeting, facilitated by the Mauritius Oceanography Institute and the Nairobi Convention Secretariat, was attended by ministers and other senior diplomats thereby ensuring a greater level of commitment. A number of key presentations were delivered to underscore not only the negative impacts but also opportunities for development. ORI's Michael Schleyer and Rudy van der Elst contributed to the deliberations which were held in Mauritius at the end of March.

The final Statement and presentations will be posted on the WIOMSA web and more will follow in the next *Oricle*.



The Oricle is an informal newsletter produced to keep our friends and collaborators informed about our current activities.

END OF AN ERA...

The Tagging Project Salutes Elinor Bullen.

In the early 1980s ORI developed a nationwide fish tagging project which promoted tag and release amongst recreational as well as commercial linefishers.

We soon realised that this was no ordinary task, as enthusiastic anglers signed up in large numbers. However, their enthusiasm also meant that dealing with the anglers required skill and tactics beyond that normally vested in the scientific staff.

Patient but firm explanation of the tagging rules was called for – as well as meticulous record-keeping and communication with the fishermen. With a stroke of good fortune, we tempted Ms Elinor Bullen to join ORI and for the past 26 years Elinor has been at the helm of the day-to-day running of the ORI fish tagging project.

Elinor came with a track record of being a top angler herself and had been working in the angling industry. She was already well known to the angling community and soon showed her competence at managing the project.

Now, on her retirement, Elinor can boast to having managed the “accounts” of 4 820 tagging members, seen to the processing of ¼ million fish tagged belonging to more than 200 species and reporting on more than 12 000 recaptures. In so doing she has contributed to numerous science projects throughout South Africa that made use of the Project's results.

We are all highly appreciative of Elinor's contribution and hope that in her retirement she too can tag a few more fish and help sustain this important research activity.

The Tagging Project will in future be managed by Stuart Dunlop.



ORI Director, Rudy van der Elst with retiring Tagging Officer, Elinor Bullen

ORI IS CRUISING!



One of the fastest growing tourist markets is that of the cruise industry with close on 20 million passengers cruising to magic destinations each year. In recent times this industry has diversified to reach a wider market and more remote destinations.

In particular, the Western Indian Ocean islands and mainland Africa have enjoyed increased attention. However, the advent of more intense cruising in the WIO has meant that a number of potentially sensitive destinations are being visited by a large number of tourists. Does this pose an environmental risk and how best can this be ameliorated?

For the past number of years, scientists from ORI and the Sea World Education department have collaborated with the Durban operations of Starlight and MSC cruises to raise awareness amongst passengers visiting several unique destinations in the WIO.

Staff members are placed on board a particular cruise to provide a series of informative events, including lectures on WIO marine life, seabird and whale observations from deck and guided walks along the shores of islands being visited. In this way, our scientists have reached approximately 50 000 passengers, heightening their awareness of conservation issues.

Tourists spend cash when they visit a destination – estimated at \$3 billion per year worldwide. Thus, well managed cruise operations can result in considerable benefit to local island communities who provide goods and services to the visiting tourists.

The fact that cruise tourists do not necessarily need hotels, airports and roads means that the environmental impact and carbon footprint of tourists on small islands can be minimised. In this way, islands such as Bazaruto, Inhaca and Nosy Be have benefited from visits by cruise tourism.

The ORI staff participate in their own time and seldom complain about the fine dining and the on-board entertainment! The lecturing provides good training opportunities and visiting unique island destinations is an opportunity envied by many.

INDIAN OCEAN PORTS AND CITIES

Durban's port is one of the most important in the Indian Ocean, serving as a springboard for huge volumes of trade goods in Africa and in the wider Indian Ocean region.

Recognizing this importance, and the maritime significance of the Indian Ocean in general, a newly-formed international association seeks to create an identity for port-cities in the Indian Ocean region, particularly with a view to facilitating exchange of information on development in these cities.

Known by the acronym IOO (Observatoire Villes Ports Océan Indien), the association is part of the international network of port cities (AIVP), and Durban was honoured by hosting the first workshop in mid-February.

Mayors of the four founding port-cities members - Durban, Maputo, Toamasina (Madagascar) and Le Port (La Réunion) - attended, together with senior city planners, signifying the importance of this event. Port management authorities from these countries also attended, together with their counterparts from Kenya, the Comoros and Mauritius.

Besides presentations re-affirming the importance of this region, there was report back on two projects commissioned by

IOO, namely analyses of the Indian Ocean cruise liner industry and environmental policies of IOO port-cities.

Needless to say, there was considerable debate on the impacts of piracy raised in the former report. Durban featured prominently in both reports, emphasising the efforts of our city to meet the variety of demands placed on it.

There were also invited presentations on the unique solar-powered electricity generation project in Le Port, and the broad-based approach to climate change adopted by the Ethekeini Metro.

ORI featured as well, with a presentation by Sean Fennessy on fishing in the Indian Ocean, in which he highlighted the responsibilities of ports when it comes to monitoring, control and surveillance of fishing activities – much-needed, given the high proportion of non-Indian Ocean fleets which operate here, and which use our facilities for discharging and re-supplying, while generating important income for the ports.

An IOO project on the role and importance of ports for fishing has been mooted, and ORI could well be approached for input on this.

KEY BOOKLET ON THE KWAZULU-NATAL COAST RELEASED

One of the core elements of the new Integrated Coastal Management Act (ICM) is the raising of awareness amongst the public and stakeholders on issues relating to coastal zone management.

More than ever there is a need to inform people who use the coast about the potential benefits of a well-managed coast, as well as the responsibilities that are bestowed on all of us who cherish the sea and shore.

Hot off the press is an informative booklet titled "Understanding our Coast", a product of collaboration between ORI and the KwaZulu-Natal Department of Agriculture, Environmental Affairs and Rural Development.

At the official launch of the Guide in February 2011, MEC Lydia Johnson noted that the guide was the first product of its kind in South Africa and bridged the gap in ensuring that everyone understands why our coast is a unique asset, which must be managed accordingly.

The document lays the foundation for a change in attitude and behaviour towards this special place we call Our Coast. It is

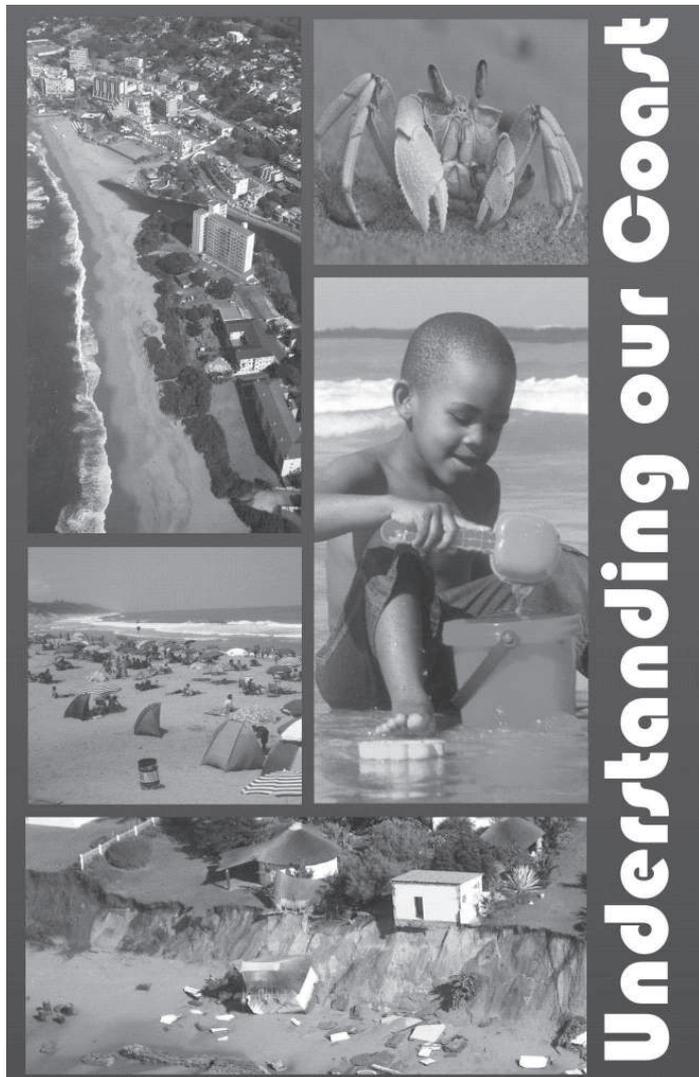
planned that over the coming months the Guide will reach as wide an audience as possible.

The well-illustrated Guide includes informative sections on marine life, harvesting resources, ecosystem services, development along the coast and useful chapters on rights and responsibilities. Climate change is addressed in the light of sea-level rise and increased storm events.

The implications of the new ICM Act are discussed and the chapters of the Act are broadly outlined and explained. Also useful is the list of contacts provided so that users will have more direct access to coastal services and decision-makers.

It is hoped that all coastal users will obtain a copy as a reference document at some stage. Hard copies in either English or Zulu are available from your local authority or from the librarian at ORI (library@ori.org.za). Alternatively, visit www.ori.org and download your own pdf copy.

OUR COAST, OUR FUTURE. SEKUNJALO.



MEC Lydia Johnson (right) at the launch of the Guide "Understanding our Coast" (left)



STRONG ORI PRESENCE AT SAMSS 2011

The 14th South African Marine Science Symposium (SAMSS) and 49th Estuarine and Coastal Sciences Association (ECSA) International Conference was hosted by Rhodes University during the first week of April 2011.

The theme of the academic gathering was Estuarine, Coastal and Oceanic systems: breaking down the boundaries, and was attended by approximately 400 delegates. SAAMBR sent a dynamic team of 14 representatives which included six scientific staff from ORI, five ORI students and two members of the Sea World staff.

The standard of the oral presentations and posters exhibited by our attendees was first-class and the positive feedback from the scientific community was tremendous. Catherine Stow, an MSc student of Fiona MacKay, was awarded first place for the best student oral presentation. This is testament to the quality of student training taking place at ORI.

In between the various themed sessions, there was a strong social component to the symposium that strengthened ties between ourselves and other research institutes. This culminated in a banquet evening where all the delegates put science aside, donned their party hats and took to the dance floor.

The conference was an enormous success from many aspects and there is no doubt that the next SAMSS will be attended by a SAAMBR delegation that will be stronger than ever.



agriculture, environmental affairs
& rural development

Department:
Agriculture, Environmental Affairs
& Rural Development
PROVINCE OF KWAZULU-NATAL



A synopsis of KZN's coastal zone

STUDENT CORNER

In this issue we profile two ORI students who have been awarded their MSc theses this month.

Supervised by Bruce Mann and Rudy van der Elst (ORI) and Dr Paul Cowley (SAIAB), **Jade Maggs'** thesis was entitled *Fish surveys in exploited and protected areas of the Pondoland Marine Protected Area with consideration of the impact of the MPA on coastal fisheries*.

In June 2004, 80km of the Pondoland coast was declared a multiple-use marine protected area (MPA). This coastline is a zone of transition between two bio-geographic regions and was identified as a critical gap in South Africa's MPA network.

Part of the protected area is a 40 x 10km no-take area, which is closed to offshore exploitation. The objectives of the closure are conservation of biodiversity and the rebuilding of commercially important line-fish stocks, which have been depleted by over-fishing.



Between 2006 and 2010, regular monitoring was conducted to evaluate the outcome of the fishery closure. The direct effects on previously exploited line-fish species were tested by means of a controlled fishing experiment, while an underwater visual census focused on indirect effects in the wider fish community.

The potential benefit of the fishery closure on adjacent fisheries was investigated by means of a tag-recapture experiment, which assessed fish movement within and between the no-take area and the adjacent exploited area.

Jade Maggs

Also supervised by Bruce Mann and Rudy van der Elst of ORI, **Stuart Dunlop's** MSc thesis entitled *An assessment of the shore-based and offshore boat-based linefisheries in KwaZulu-Natal, South Africa* can be summarised as follows:

In order to evaluate the management effectiveness of the KwaZulu-Natal linefishery, surveys of the shore-based and offshore boat-based linefisheries were undertaken between February 2009 and April 2010.

Methods used included a stratified-random creel sampling technique for the shore-based linefishery and a random access-point sampling technique for the offshore boat-based linefishery.

Overall, excluding an increase in the number of charter vessels and associated fishers, it appears that there have been relatively few new entrants into the KZN linefishery since the last national linefish assessment conducted in 1994-96.

In contrast, total angler effort in both the shore and offshore linefisheries has decreased substantially in the past 12 years. This is as a result of changes in management, as well as biological and socio-economic factors influencing these fishery sectors.

Analysis of overall catch per unit effort (CPUE), catch composition and total catch in both these linefisheries suggested that they are currently in a relatively stable condition (ie little change in the past 12 years). However, further analysis of CPUE for several important linefish species suggests that stocks may have been fished down to low levels.

Recommendations such as improved management of the charter fishery and ongoing establishment of an effective MPA network are discussed in the thesis.

Significant differences were evident in the wider fish community between protected and exploited areas, possibly linked to contrasting levels of predation and competition.

Movement patterns indicated that the majority of fish maintained small home-ranges, while a small portion abandoned their home-range and headed northwards up the KwaZulu-Natal coast, becoming available to nearby fisheries.

Recommendations such as improved management of the charter fishery and ongoing establishment of an effective MPA network are discussed in the thesis.



Stuart Dunlop

SOME RECENT PUBLICATIONS INVOLVING ORI STAFF & STUDENTS

- CYRUS, D., JERLING, H., MACKAY, C.F. & VIVIER, L. 2011. Lake St Lucia, Africa's largest estuarine lake in crisis: Combined effects of mouth closure, low levels and hypersalinity. *South African Journal of Science* 107 (3/4): 13p.
- GUERREIRO, J., CHIRCOP, A., DZIDZORNU, D., GRILO, C., RIBEIRO, R., VAN DER ELST, R.P. & VIRAS, A. 2011. The role of environmental instruments in transboundary marine protected areas: An approach in East Africa. *Marine Policy* 35: 95-104.
- DUNLOP, S.W. 2011. An assessment of the shore-based and offshore boat-based linefisheries of KwaZulu-Natal, South Africa. MSc thesis, University of KwaZulu-Natal, Durban: 211p.
- FLOROS, C. 2010. An evaluation of coral reef fish communities in South African Marine Protected Areas. PhD thesis, University of KwaZulu-Natal, Durban: 188p.
- MACDONALD, A.H.H. 2010. Connectivity of two scleractinian corals in the south west Indian Ocean. PhD thesis, University of KwaZulu-Natal, Durban: 122p.
- MAGGS, J.Q., 2011. Fish surveys in exploited and protected areas of the Pondoland Marine Protected Area with consideration of the impact of the MPA on coastal fisheries. MSc thesis, University of KwaZulu-Natal, Durban: 140p.