

THE ORICLE

Newsletter of the Oceanographic Research Institute



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New Home for ORI

For close on 1/2 a century South African Association for Marine Biological Research was located at the Durban Centenary Aquarium complex at the lower end of West Street. Here ORI had its offices and laboratories, from where in excess of 1000 scientific papers were published and more than 100 post graduates trained. While these premises served ORI exceptionally well, it was also time to modernise and plan for the next 50 years. Thus, around Easter of 2004, the entire SAAMBR operation, with its Sea World facilities, Education Centre and ORI, moved to the new uShaka complex, some 3 km to the south of the old site. Here, the new premises for ORI include a range of scientist offices, laboratories, student facilities, a mariculture laboratory and a stunning library. Not only are we able to accommodate the present ORI staff compliment but some room



for growth has also been allowed, especially in the light of ORI's increased activities in the wider West Indian Ocean region.

Much of the drive for new facilities was made possible with support received from the Unicity of Durban, just as the City did in our original establishment so many years ago. We are thrilled that Durban has once again invested in our future. SAAMBR staff and management are confident that we will continue to deliver excellent services and that this further strengthens our position as one of the region's most important centres for marine conservation, research and education.



Spotted Eagle ray gracefully 'flying' through the ocean tank.

The Nairobi Convention ...

...A regional plan to protect the West Indian Ocean (WIO)

In order to promote international collaboration in the protection of shared marine and coastal resources, the United Nations Environmental Programme (UNEP) inspired the vision of a Regional Seas Programme. One of the 17 programmes developed worldwide concerns protection of the WIO, and is embodied in an agreement called the Nairobi Convention. Though it was launched in 1985, South Africa only recently signed the convention. However, ORI has for many years been engaged in projects of direct concern to the Nairobi Convention and at its most recent ministerial conference of parties (COP4), held in Antananarivo, ORI was again in evidence.

The overall objective of the Nairobi Convention is to ensure sustainable development through protection of the marine and coastal environment of the West Indian Ocean (WIO). This is achieved through a series of actions endorsed by the environmental ministers of at least eight countries in the region. The secretariat of the Nairobi Convention is based at the UN complex in Nairobi and is headed by Dixon Warruinga. One of the activities supported by his office is the Jakarta Mandate project of the IUCN (East African office), which is largely funded by the Norwegian Aid agency NORAD. This project is related to the protection of biodiversity in the WIO and specifically involves ORI and other partners in developing a fisheries information system for improved resource management in the region. The first phase of this work was recently completed and it was a highlight for ORI's Rudy van der Elst to be able to present the first draft of the system to Minister of Environment

of Madagascar, the new incoming chair of the Convention. The meeting presented excellent opportunities for developing new initiatives and for affirming the good relationship ORI has developed with many countries of the region. Also present at the meeting was Mrs Rejoice Mabudafhasi, South Africa's deputy minister of environmental Affairs, who emphasised the synergy between the African Process (NEPAD) and the Nairobi Convention.



Tea time at the Nairobi convention meeting-Rudy van der Elst with Mrs. Rejoice Mabudafhasi, Prof. Wangari Maathai Nobel laureate deputy environmental ministers of South Africa and Kenya respectively.

WEST INDIAN OCEAN HIGHLIGHTS

The West Indian Ocean is a region of great diversity and importance. More than 2200 species of fish have been found in this the 4th largest ocean. These range from numerous small reef and shoaling fishes to the giant whale sharks and prehistoric coelacanths. Each year, between 4 and 8 million tons of fish are harvested by more than 60 countries. But catches are declining at a time when needs for food and jobs are enormous.

Best estimates indicate that 1/3 of the region's population (more than 60 million people) reside within 100 km of the coast and in most cases there is great dependence on marine resources for food security and employment. For example, in Mozambique, with its 90 000 fishers, it is estimated that 50%

of the population's protein intake comprises fish. In the case of Tanzania it has been stated that up to 70% of animal protein intake may comprise fish, which would include fresh water harvests from the great lakes. In Tanzania, 21% of the population resides in the coastal zone and an estimated 50 000 people are engaged in some form of marine harvesting. In Madagascar an estimated 55% of the 17 million population lives in the coastal zone, most intimately linked to the sea for food security and jobs. Estimates made in 1991 suggest that fisheries contribute about 2% to the GDP of the West Indian Ocean region. Clearly, an Ocean of great consequence!

Monitoring the activities of small crafts.

For many years, fishermen, divers, whale watchers, tourists and others who venture to sea have made use of surf-launching skiboats; unique KZN craft able to traverse the often rough surf conditions. Over time some 50 sites have sprung up to accommodate these launchings, accounting for thousands of trips to sea each year. However, this growth in boating has not been matched by improved management systems or safety considerations. Accordingly, the KZN Provincial Government recently decided to rationalise the management of these sites by seeking their formal registration. As part of this process a monitoring system has been introduced that will provide detailed statistics on pattern of use and management needs. An unexpected bonus has been the simultaneous opportunity to collect fisheries statistics, a task spearheaded by ORI's Pierre Pradervand.

The monitoring is achieved through site-specific launch registers, formally termed the "Boat Launch Site Monitoring System" or

BLSMS for short.

It is a partnership project involving four major stakeholders: Ezemvelo KwaZulu-Natal Wildlife, the Oceanographic Research Institute, the Coastal Management Unit of the Department of Agriculture and Environmental Affairs (KZN) and the various launch site users themselves. ORI is providing a service that involves the capture and scientific interpretation of the records which are then presented to all of the stakeholders.

We know all too well that few fishers enjoy filling in detailed registers after a day at sea, but to date there has been good collaboration and the details of 2 000 launches have been recorded. In time these data will become a valuable indicator of the state of our fisheries and the need for their management, in addition to providing information supporting the development of improved boat launching facilities along the KZN coast.

Can corals adapt to climate change?

Corals can broadly be divided into hard corals that build reefs and soft corals that are attached to existing reefs. Both forms come in a wide range of shapes and sizes, each species uniquely adapted to its niche in the coral reef ecosystem. But there is growing evidence that changes in global climate may impact in corals, such as bleaching of reefs and the destruction of coral ecosystems. As corals are sessile and cannot just move away from adverse conditions, how else can they cope with these changes?

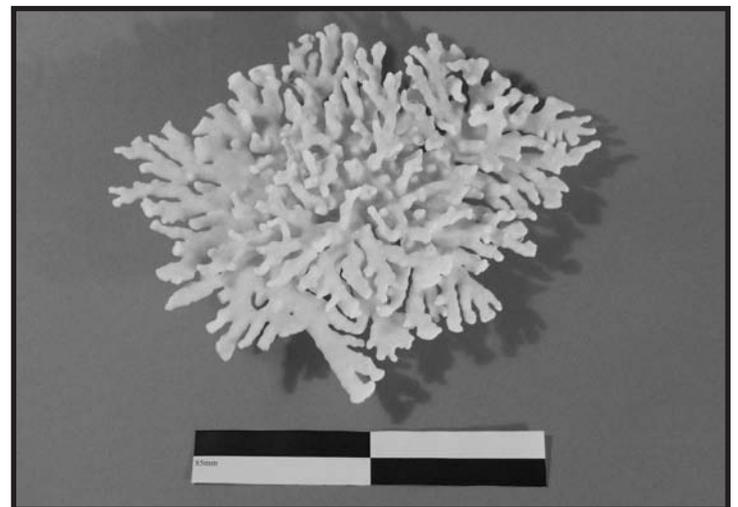
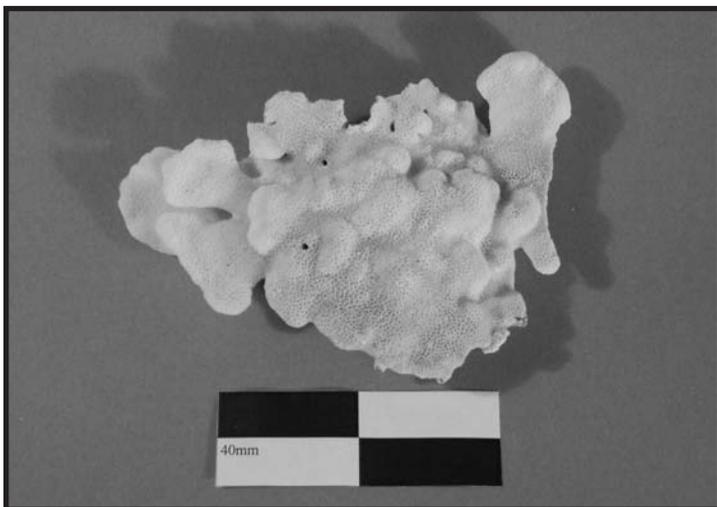
Hard coral communities of the south western Indian Ocean are especially vulnerable with rising sea-surface temperatures threatening their existence in several regions. Understanding how, if at all, some corals may react to such changes in environmental conditions may help to predict the future consequences of climate change to reef systems in our oceans.

This approach forms the basis of a study at ORI, using a local

species of hard coral as research subject.

The genus *Stylophora* is quite widely distributed in South Africa, ranging from sub-tropical Kosi-Bay to the cooler Pondoland coast. This is a marginal environment for hard corals (*Scleractinia*) as the water is too cold and turbid with low levels of dissolved aragonite, a chemical used by corals for building their skeletons. However, this marginal environment provides a perfect setting for a natural experiment in changing habitats. This particular genus of coral is well known for its wide distribution and also its varied growth forms, which appear to be related to prevailing environmental parameters.

The ORI project, undertaken by Masters student Angus MacDonald, will investigate these different growth forms along our coast and based on genetic analysis draw inferences about the ability of some corals to adapt to environmental changes.



Two growth forms of the same species of *Stylophora*.

Charter boats-opportunity for development?

Fishing off the KZN coast is always a fine experience, even if fish are not on the bite. The thrill of being at sea amongst a diversity of marine life and, indeed, the possibility to land a big one is the dream of many. But not all anglers are in a position to have their own fishing boat. However, the problem is easily solved by chartering a boat for one day, or even "renting" a seat on a vessel for a day's fishing. This charter fishing has become increasingly popular, especially as it generates additional revenue for traditional linefishers who have seen their catches continue to dwindle.

But what are the real benefits of charter fishing? Does it add to ecological stress or does it relieve existing fishing pressures? ORI has been tasked to conduct a two-year study of the KZN charter boat fishery. The study is based on catch statistics and also on direct interviews with expert charter operators. Included is an assessment of the relative social, economical and environmental implications of this sector of the fishery, with a view to sustainable development in years ahead. The study has taken the form of an interview survey of most of the province's charter boat operators, together with an access-point survey of charter boat catches at popular chartering venues such as Shelley Beach, Durban harbour, St Lucia and

Sodwana Bay. To date, more than half of the provinces charter boat operators have been interviewed, and the catch details from more than 5 000 hours of charter fishing has been documented. Final analysis and report preparation will commence in December 2004, with the results and recommendations being publicised in early 2005.



ORI Contributing to key regional activities

Coral reef survey in Madagascar

In June 2004, Michael Schleyer undertook a preliminary qualitative survey on the reefs in the region of Tamatave, on the east coast of Madagascar, in order to assess possible impacts of a proposed marine outfall for a nickel processing plant. While the reefs are extensive, they proved to be naturally stressed and were relatively poor in biodiversity. Their condition appears to have been compromised by subsistence fishing activities, increased turbidity and ENSO-related coral bleaching in that order. All in all, the diving was quite spooky on occasions, working in near zero visibility on shark-inhabited, coral reefs! Recommendations included better management of reef resources and reducing impact of the pipeline so that future reef rehabilitation is not compromised.

The 10th international coral reef symposium

Every four years the coral reef scientists of the world congregate at a symposium to deliberate the status of these fragile and threatened ecosystems. This year it was held in Okinawa, Japan, and was attended by ORI's Michael Schleyer. A highlight concerned discussions on biodiversity loss through a range of threats, and the possible resilience and the role of large herbivorous fish. The role of fisheries management was emphasised, while the growing crisis of coral loss was also a vexing issue. It was recommended that more and bigger no-take areas were needed ($\geq 30\%$), including an approach using co-management. Co-ownership of reef resources should be empowered and reinforced in anticipation of their uncertain future, not after their demise. The markets for reef resources needed reform.

Histology in Hawaii

Most people would visit Hawaii for a unique holiday experience, but ORI's Alke Kruger went there to receive advanced training in histology, especially that associated with corals. The international event was hosted by the Hawaii Institute of Marine Biology, based on Coconut Island, in Kaneohe Bay on the north-eastern shore of Oahu, Hawaii. A total of ten researchers and students from South Africa, Australia, America, Russia and Bermuda attended the course in "Histotechniques and histology of the Anthozoa". The activities entailed theory as

well as field and laboratory work and covered a wide range of topics, ranging from specimen and field data collection, histology processing and pathology of hard corals and sea fans. Histology, or microscopic anatomy, is the study of cells, tissues, organs and organ systems of plants and animals, and is used to improve our understanding of functions such as reproduction, metabolism etc. The knowledge gained in this course will be useful in ORI's future studies on coral reef health, including reproduction and coral diseases. The National Research Foundation is gratefully acknowledged for providing funds.

Johannesburg World Summit on Sustainable Development: WSSD+2

In order to maintain the momentum of the Johannesburg World Summit on Sustainable Development (WSSD), a follow up summit was held by the Department of Environmental Affairs and Tourism, appropriately called WSSD+2. This three day event in September involved roundtable discussions according to six distinct themes. One of these revolved around the topic of original Biodiversity targets set. ORI was invited to participate and Rudy van der Elst presented an overview of the regional marine biodiversity programmes in the West Indian Ocean (WIO).

Royal Society Symposium

Scientific interest in the West Indian Ocean continues to escalate. Besides the growing number of large donor-supported research projects being developed, there have been several strategic scientific meetings. One of these was hosted by the Royal Society in London, which brought together a marvellous array of international scientists who presented an overview of the physical, climatic and biological features of the WIO. Making use of the most advanced remote sensing techniques and digital imaging, many new facts were presented, including revised understanding of currents, nutrients and geomorphology of this fascinating ocean. ORI's Rudy van der Elst was invited to present a paper titled: fish, fishers and fisheries of the West Indian Ocean.

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