



# SANCOR NEWSLETTER

## South African Network for Coastal and Oceanic Research

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### TRACKING DEVELOPMENT OF MARINE SCIENCE CAPACITY IN SOUTH AFRICA: A SYNOPSIS

Kim Prochazka & David Miller

The South African marine science community has been becoming increasingly concerned about issues surrounding marine science capacity in the country. The ongoing erosion of this capacity through the continued brain-drain and loss of senior scientists to retirement or more attractive prospects outside of marine science is a major cause for concern. Not only does the loss of these senior scientists compromise the country's ability to develop new capacity, but it also places an increasing urgency on the need for development of new or replacement capacity.

A number of concerns and issues surrounding capacity development have been highlighted by the marine science community through SANCOR, as requiring investigation. These included the perceived decline in the numbers of marine science students over the past 5 years, tracking trends in gender and racial transformation and equity in the student body and in the workforce, examining potential barriers to student entrants into marine science, and the retention of trained individuals within the field of marine science. This synopsis stems from a pilot study by SANCOR to investigate these issues.

Has there been a decline in the numbers of marine science students?

education in marine science and bursary recipients between 1999 and 2003.

Data of student registrations for the years 1999 to 2003 were sourced from student records at tertiary institutions and used to investigate the perceived decline in numbers of marine science students (Figure 1). No detectable declines in the numbers of Diploma, Honours, MSc or PhD students were evident during this time period, indicating that the concern of a decline in student numbers appears to be more a perception than a reality.

Comparison of the numbers of marine science students registered at tertiary institutions with the numbers holding NRF bursaries through the Sea and Coast Programme (Figure 1) indicated that a large proportion of registered MSc and PhD students are supported by these bursaries. This highlights the significant role that the Sea and Coast Programme and its two investors (NRF & MCM) play in developing marine science capacity in the country.

Has there been a shift in the demography of marine

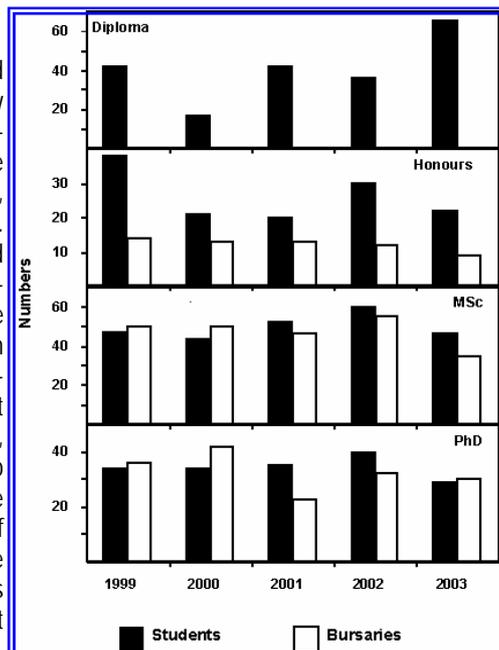


Figure 1. The numbers of students registered for tertiary education within Diploma students

Differing stories emerged with respect to demography of students registered for different degrees. An apparent shift from a predominance of White students to a predominance



(Figure 2), although this shift was not statistically significant. Within this group, statistically similar contributions were made by male and female students both in 1999 and 2003.

The demographic composition of Honours students has fluctuated seemingly randomly over the five-year time period, with no significant differences in the numbers of students belonging to the four demographic categories throughout the period under review (Figure 2).

Data for MSc students indicate a clear decrease in the contribution of White males during the five-year period, along with a clear increase in the numbers of Black female students over this time (Figure 2). The MSc student pool has thus shifted from being significantly dominated by White male students in 1999 to being significantly dominated by Black female students in 2003.

Longer-term data are necessary to elucidate whether or not this trend will continue. No significant shifts were evident in the student demographics within the PhD contingent, with White males being the greatest contributor in all years (Figure 2).

The demographics of NRF bursary recipients were investigated to explore the role of the NRF in effecting transformation and promoting equity in marine science. Because of the relatively close correlation between the numbers of registered students and the numbers of students receiving NRF bursaries, these data followed similar trends to those already discussed for student registrations. Within MSc bursary recipients in

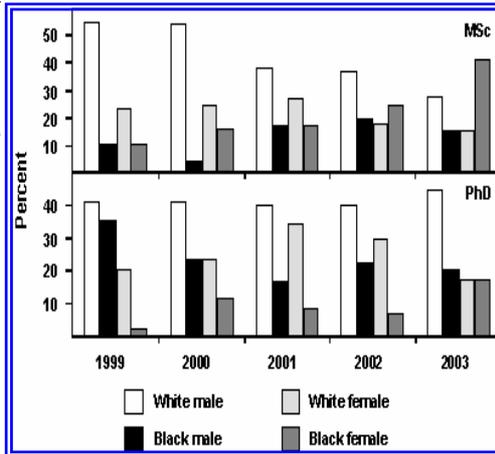


Figure 3. The demographic composition of marine science students receiving NRF bursaries from 1999 until 2003.

As the single largest employer of marine scientists, the Research and Development section of MCM was chosen as a case study for investigating transformation and the quest for equity in the marine science workforce. Between 2002 and 2005, White males have remained the most abundant demographic group (Figure 4), while females remain poorly represented. Thus, although the data indicate that there have been some efforts at creating a more equitable marine science workforce in the Research and Development section of MCM, this remains far from representative of the demographic makeup of the country as a whole. Part of this is undoubtedly the result of a relatively slow staff turnover coupled with the freezing of vacated posts, and hence the lack of opportunities for integration of the new generation of trained Black individuals into the organization.

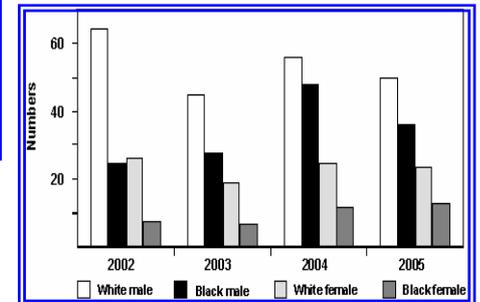


Figure 4. The demographic composition of Research and Development staff at Marine and Coastal Management from 2002 until 2005.

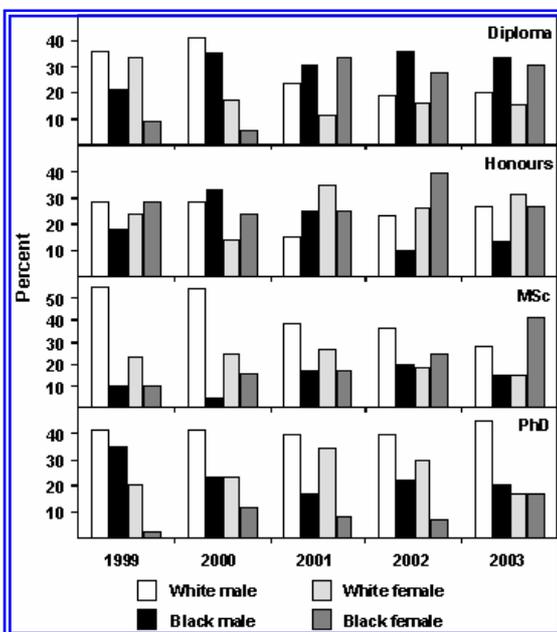


Figure 2. The demographic composition of registered marine science students between 1999 and 2003.

1999, the greatest proportion of bursaries were awarded to White male students (Figure 3). In 2003, however, White male bursary recipients were in the minority, and a far greater proportion of bursaries was awarded to Black and female students. There were, however, significant fluctuations in the demographics of bursary recipients throughout the five years, and longer-term data will be necessary to elucidate whether this is indeed a continuing trend.

There was no change in the demographics of PhD bursary recipients between 1999 and 2003 (Figure 3), with the majority of bursaries being awarded to White students in all five years. There were no significant differences in the numbers of bursaries awarded to male and female students in any of the years.

What are the barriers to students entering and remaining in marine science, and how can we better encourage and retain students?

Responses from student questionnaires were compiled and synthesized into a logical framework or Student Development Pathway (Figure 5). In this pathway students develop an interest in marine science, pursue this by entering the tertiary education system and progressing through it, eventually following a career in marine science. A number of factors influence each of these stages, and the results of the student questionnaire surveys provide some insights into these factors.

Interest in marine science appears to develop at an early age through individuals' own experiences with the marine environment, the presence of strong role models, and through television documentaries. The

What role is the NRF fulfilling in effecting transformation and promoting equity through the development of marine

Are we seeing transformation and promotion of equity in the workforce? MCM as a case study



second step in the pathway is the recruitment to higher education. Students appear to choose institutions based on a perception of the quality of marine science at that institution, which is in turn based on their evaluation of the quality of researchers, lecturers and curricula.

pects in marine science which is highly discouraging to students. However, increased awareness of marine and coastal issues in South Africa has led to a far larger and wider job market than was available 10-15 years ago. Perhaps we need to ask if our current capacity development efforts

must inevitably and necessarily conform to the administrative, policy, staffing, branding and financial conventions of a Department whose Head Office is in Pretoria. Even though MCM has more than half the staff of the Department, Pretoria is the driver. As a consequence the fishing industry could be forgiven for feeling that it is something of a step-child in the affairs of Government.

In the distant past attempts were made to attach, *See Visserye*, as it was known, to Agriculture and Trade and Industry. MCM, like the navy, are probably the only sectors in Government that should be managed from the coast. But the case of the SANDF is fundamentally different to that of DEAT. The defense of a country, by its very nature has to have a central command structure which happens to be in Pretoria. A fisheries administration is not connected to Pretoria by rationale.

The attempts to 'integrate' and 'align' the divergent sections within DEAT over the years, has done more harm than good, at least when looked upon from the fisheries perspective.

Those outside the fishing sector may view the proposition that fishing has unique and very special needs, fanciful or self-centered. Since fishing contributes, allegedly, only 1% to the GDP of South Africa, a special dispensation for marine resources may sound indulgent. Yet fisheries the world over are managed separately. In New Zealand it took a parliamentary commission of enquiry to recommend that fisheries needed to be separated from agriculture. Our neighbouring states all have Ministers of Fisheries.

The time has come for South Africa to recognise the case for a dedicated fisheries authority. A separate fisheries dispensation would give recognition to coastal communities whose long and strongly-held traditions are interwoven with fishing and the sea. It would provide recognition to the argument that fish constitute a major source of protein which requires urgent protection if we are to avert the severe depletion of this resource through over-fishing and the increasing and often devastating impact of fishing beyond our territorial waters, through chemical and effluent from our rivers and through the migration of increasing numbers of our population to coastal areas.

Parliament is frequently being lobbied by

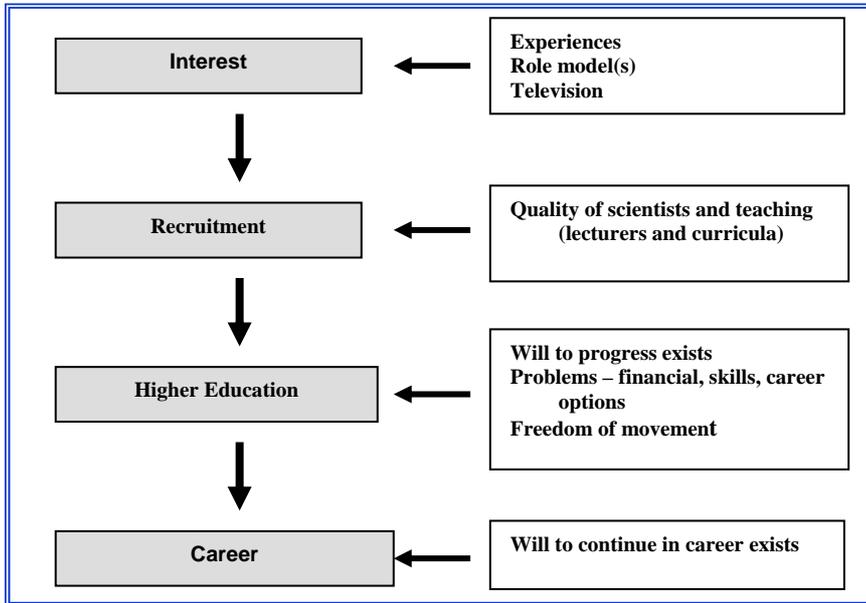


Figure 5. The Student Development Pathway, a model of capacity development.

Interest in marine science appears to develop at an early age through individuals' own experiences with the marine environment, the presence of strong role models, and through television documentaries. The second step in the pathway is the recruitment to higher education. Students appear to choose institutions based on a perception of the quality of marine science at that institution, which is in turn based on their evaluation of the quality of researchers, lecturers and curricula.

Once students are in the third step of the Student Development Pathway, their will to continue with their chosen path is clear. Barriers which they face at this stage include financial constraints, under-developed skills, and the prospects of limited career options. Many students felt that their freedom of choice of academic institution and their movement between institutions was limited, primarily by financial constraints.

They will to continue with a career in marine science after completion of tertiary education remains strong. There is, however, a perception of limited career pros-

pects are not too narrowly focused on producing academic scientists for which there is a very limited market, and if we are not ourselves responsible for passing on a negative image of careers in marine science?

**A REFLECTION ON FISHERIES MANAGEMENT IN SOUTH AFRICA**  
*Horst Kleinschmidt*

**DISCLAIMER**  
*The SANCOR Steering Committee encourages robust, indeed provocative, debate about any matters relevant to the Marine Science Community. The opinions and views expressed in this article are not a reflection of the views of the SANCOR Steering Committee or the Editors of the SANCOR newsletter. We will allow opportunity for rebuttal where appropriate. Thank you to all who support the SANCOR newsletter.*

The management of fisheries and tourism does not easily go together. That is what the Department of Environmental Affairs and Tourism (DEAT) has tried ever harder to do. Phenomenal effort and time has been spent to fit them under one hat.

Marine and Coastal Management (MCM) is the largest Branch of DEAT. As a Branch it



fishing interests. Media attention to fishing outweighs that of other economic sectors. This is due to many possible factors: fishing communities are volatile and vociferous in their demands, albeit, mostly, not well organized. They also conjure up romantic notions in the eyes of non-fishers; it must be for this reason that the print and television media are eternally wooed by images of dilapidated fishing boats, fishermen's huts and the proverbial toothless fisherman. A lawyer serving on the British Royal Commission into fisheries recently commented: When I looked up what fishing contributed to the UK GDP, it was only slightly more than the lawn mower industry, but, he lamented, that industry simply does not have the clout the fishing industry have.

My argument however goes to another, immediate and much more urgent issue. To build a civil service that is responsive and understanding of the complex needs in this sector, depends on a bureaucracy that does not require hoops and loops for approvals and decisions that take forever and pass distant desks where the knowledge of the sector simply does not exist.

A dedicated fisheries administration would give recognition to the need that fisheries management is about a huge variety of marine organisms and fish stocks, some of which are commercially exploited, others recreationally in an eco-system that is facing ever larger threats. South Africa cannot escape its regional and international role in the management of the oceans. Without the linkage to scores of international agreements, South Africa would simply lose its commercial rights to high seas quotas as well as its moral authority as the custodian of the Johannesburg-WSSD agenda. It is not far-fetched to expect the oceans and all that they contain, living resources, mineral, gas and oil to move center stage in international diplomacy in the next decade. If South Africa has foresight it might do worse than investing in able fisheries administration.

But on the ground there is another reality that needs to be confronted. MCM, by the nature of its role, is in direct touch with fishermen and women in their hundreds, every day. The management of fish stocks requires social and administrative interaction. The one requires social and institutional knowledge that can only be developed over long periods; the other requires administrative systems that are efficient,

interactive and empathetic. It relies on relationships with people. The tourism branch does not meet tourists every day! (Nor does the bio-diversity branch, also part of DEAT, need to engage their client group to the extent required in fisheries). In practice it turns out that for MCM to fit into the Pretoria modus is generally for it to fail its fishing clients.

My intention here is not to knock my erstwhile employer or former colleagues. They are good and conscientious people who have a belief that they should contribute to the common good. But the system they serve, however well-intended, is not meeting the needs of stakeholders in the fishing sector.

To overcome the impediment Minister van Schalkwyk should be approached to appoint a second Director General, responsible for fisheries and directly accountable to the Minister. In Land and Agriculture the reality demanded such a division; in Science and Culture a similar division was made. Such a dispensation avoids the proliferation of new Ministries and bureaucracies and thus the associated costs.

You may call this wishful thinking or not more than sending a letter to Father Christmas. I think it warrants serious consideration. It would be good for the fishing industry, good for service delivery, good for the morale of MCM staff and a strategic move that is good for our country.

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### **AFRICA: A NEW SCIENCE FOR A NEW SOCIETY?**

*Camaren Peters*

#### ***What good is having a cell phone if one doesn't have running water at home?***

How science and society relate to each other is not just a philosophical question. It is a scientific question of increasing importance to governments, industry and society alike. How human activities affect the environment is of crucial concern to governments and regions as they attempt to perform sustainable development in an environment of increasingly larger scale development initiatives (e.g. SADC and NEPAD).

As yet, we have no reliable scientific understanding of how economy, environment and

society affect each other. For example, the effects of global climate change might have been mitigated had a more integrated strategy towards industrial pollution been adopted in the past. The challenge for our new society lies in integrating our understanding of these disciplines, so that environmentalists, economists and social scientists can work together in directed research efforts to yield more useful information and insight into larger scale development problems.

Society funds scientific research heavily and therefore rightly expects to see social benefits from science. Scientific research is now being asked to link itself more explicitly to social and economic benefits. Over history, science has often been funded by military, industry and business. However, in the current knowledge-based world economy, science is increasingly being funded as part of governments' national strategies.

Traditional science is different from science today. Traditional science sought to produce equations that would explain *absolutely* everything, providing a clockwork universe. Modern science acknowledges that there is uncertainty in our understanding of nature whereas traditional science does not. Modern science tells us that understanding is *not absolute*.

Science has proven both dangerous and helpful to society. It provides a narrow analysis of reality and isn't the absolute truth. It was used to justify racism and sexism and brought us into the current nuclear military age. However, it has grown different disciplines of theoretical knowledge in leaps and bounds throughout the environmental, economic and social sciences. Until recently, efforts at integrating these disciplines have been based on traditional science methods and techniques. With the advent of large inexpensive computing hardware and software, new techniques and methodologies (e.g. simulations, artificial intelligence) are taking precedence in interdisciplinary science research into ecological and economic problems.

South Africa funds a complex system of organisations through a variety of funding routes in its National System of Innovation. Our government therefore expects to see social *and* economic benefits from science. By encouraging more multidisciplinary research efforts we hope to build to a kind of science that seeks to contribute to society



directly and makes meaningful differences in various aspects of quality of life affecting both the middle and lower economic classes, who should all stand to benefit more out of a technological society.

In order to promote sustainable development principles there is now more funding available for multidisciplinary research efforts into the future integrity of the environment. There is thus more room now in science for scientists who don't necessarily want to spend 30 years locked away working on one specialist discipline, but who want to contribute to wider research efforts and learn about other disciplines, migrating concepts between disciplines and growing their careers in a variety of directions. Careers in computational physics now lead to careers in high finance investment banking, marketing, computer gaming, or space shuttle construction. The possibilities are endless. It is only our perceptions of science which limits us.

More importantly, we need a new generation of a new *type* of thinker; of generalists rather than specialists. Science is changing; that makes it a good time for new, fresh blood who want to pursue newer and greater ideas than before. It is not a matter of mere interest that this research is conducted for; it is about the *survival of future generations*. It is an essential human struggle for survival that *science* is being asked to play a central role in. It's fine and well for every child to want to be another Mark Shuttleworth, but what we *really* need to ensure our survival is a new generation of thinkers. So step up; use your brain for your children and theirs!

### **CONTRIBUTION OF INTEGRATED RESEARCH TO POVERTY ALLEVIATION IN THE WESTERN INDIAN OCEAN**

*Serge Raemaekers & Gugu Calvo-Ugarteburu*

From the 29<sup>th</sup> of August to the 2<sup>nd</sup> of September 2005 we attended the 4<sup>th</sup> Western Indian Ocean Marine Science Association (WIOMSA) Scientific Symposium, held on the tropical island of Mauritius. Since both of us work on subsistence fisheries development in the rural areas of the Eastern Cape, we wanted to see what was happening in other African countries in this field, especially as the theme of the Symposium was the 'Contribution of research in improving human welfare and poverty alleviation'.

The Symposium was hosted by the Government of Mauritius through the Prime Minister's Office and the Mauritian Oceanographic Institute. It was encouraging to see the political support that the conference had, with three National Ministers present at the opening ceremony and some of them attending various sessions and functions. More than 200 delegates from within and outside the Western Indian Ocean region attended the conference. Some 120 oral and more than 100 poster presentations were given on a wide range of topics.

The number of presentations covering subsistence and artisanal fisheries, the socio-economic conditions of the fishers, and related governance challenges was substantial. This was reflected in three sessions covering these aspects: 'Social Dynamics in coastal and marine environments', 'Marine resources utilization including fisheries' and 'Management systems, governance frameworks and participatory processes'.

Our presentations firstly discussed the Mussel Rehabilitation Project in Coffee Bay, aimed at the rehabilitation of mussel stocks that have been overexploited, and the establishment of a co-management plan. The paper reviewed the steps taken by the Project towards achieving rehabilitation of mussels in denuded areas (moving from an initial phase with mainly an environmental approach, including socio-economic aspects and a livelihoods approach, to its present phase looking at integration with other initiatives in the area) and discussed successes and shortcomings of the different approaches making recommendations for similar initiatives. Secondly, the exploitation of the abalone resource in the rural areas of the Eastern Cape by subsistence fishers, and the implications for management thereof was looked at. The paper discussed how exemptions to the Marine Living Resources Act to undertake subsistence fishing of abalone, had been given to two communities in the former Ciskei and Transkei, but had failed in achieving a sustainable management system where the community members would assist in monitoring and compliance activities.

Both our presentations argued that the implementation of co-management arrangements for coastal resources in the Eastern Cape lacked the institutional support within municipi-

palities and the province, and that this was an essential requirement for the development of effective local management structures. However, we both felt that this alone would not be enough, and for successful management to take place, it is necessary to take an integrated approach and link with other livelihood enhancement programmes.

This opinion was mirrored by several other presentations, and the debate that ran throughout the Symposium was the fact that an increase in investment in science and technology alone in the region would not lead automatically to social and economic progress. It was felt that research and development must take into consideration local priorities, resources and capacity-building needs. Furthermore the outcomes of these programmes must reach the poorest levels of the community.

Marilyn Porter, studying gender issues in Tanzanian coastal fishing communities, was of the opinion that natural scientists too often see the fisher people as merely a 'hand' affecting the resource. She explained that we needed to broaden the categories of fishers and non-fishers and also bear in mind the socio-cultural aspects of their lives that affect the way people interact with the natural resources. She then recommended that the social science component in fisheries related research must be more importantly weighted in relation to the natural sciences and must not be merely used as a multidisciplinary tool. She argued for more integrated 'interdisciplinary' community based research where both sciences can contribute to the understanding of a particular situation in coastal communities.

Beatrice Crona showed us that groups of fisher folk, using different gear types and operating in spatially distinct subsystems of a coastal seascape in southern Kenya, had uneven levels of local ecological knowledge. She then proved that the distribution and flow of that knowledge was different within the groups and between the groups, and that it was highly dependent on the social networks in the community. This had a strong effect on the potential for collective action and consensus-building. Social network structure may therefore be a significant factor to consider when implementing co-management systems.

From all the relevant presentations, it seemed that a lot of attention was given to the development of alternative livelihoods for fishers



and training and capacity building programmes.

Narriman Jiddawi aptly presented a mariculture project in Zanzibar where women are now integrating small-scale seaweed farming with their shellfish collecting practices, by growing out undersize animals, and providing the necessary substrate in their seaweed farming plots for the settlement of shellfish larvae. Adding the shellfish production to the seaweed farming operations has the potential of improving the welfare of the women farmers and also to increase the supply of seafood protein in the local markets and tourism industry.

Training and capacity building of artisanal fishing communities in Kenya was the topic of Patrick Kimani's presentation. He discussed how CORDIO East Africa (Coral Reef Degradation in the Indian Ocean) had engaged itself in training the fisher's from developing organisational skills to marketing and financial management and the participation in fisheries research. Monitors had been trained and engaged in the measuring of fish catches, mapping the fishing grounds with other fishers, and monitoring the socio-economic evolution of the community members. Many projects had been initiated to develop local capacity, institutions and awareness, but despite all this capacity building, the main challenge still remained in the devolution of responsibilities and power from national level to the Beach Management Units, local committees set up for co-management of the coastal resources.

Joseph Tunje reinforced the previous speaker's argument that sustainable management of marine resources depends on understanding the conditions under which the majority of users live, their constraints, and opportunities that they have other than fishing. He promoted the establishment of a regional socio-economic monitoring network (SocMon) in the Western Indian Ocean. Since 2002, CORDIO has developed socio-economic monitoring by community members at four sites in Kenya and Tanzania, and is now establishing nine new sites in other countries of the region. They've also embarked on the development of a manual to provide standardised guidelines for socio-economic monitoring activities in the Western Indian Ocean.

However, it seemed to us that involvement of the resource users into management

functions and decision-making processes was still very much in its infancy throughout the Western Indian Ocean region, perhaps with the exception of the process undertaken by Ezemvelo KwaZulu-Natal Wildlife. The shift to community advocacy with regard to resource use, the devolution of power by national governments, and the establishment of formal rights-based management models for subsistence and artisanal fishers still have a long way to go.

**KEEPING OUR VULNERABLE MARINE LIFE  
OFF THE HOOK BY EMPOWERING FISHERIES  
OBSERVERS**  
*Maria Honig*

The oceanic environment off southern Africa is one of the most dynamic and diverse marine environments in the world. As a result it supports highly valued commercial fishing interests. It is also home to 24 species of albatrosses and petrels, five species of sea turtle and 36 species of sharks all threatened with extinction as a result of incidental mortality or bycatch in longline and trawl fisheries. Not all hope is lost however, BirdLife South Africa and the Worldwide Fund for Nature have collaborated to form a "Responsible Fisheries Programme" which aims to assess and mitigate the capture of vulnerable species, before the impacts of fishing all but wipe out these innocent bystanders.

This programme acknowledges the fact that fisheries observers play a pivotal role in reducing the current bycatch levels experienced in our waters. Fisheries observers are in the unique position of being able to assess and reduce the bycatch of seabirds. Firstly, they assist our understanding by collecting valuable information. This allows a detailed analysis of both the numbers of seabirds that are killed as well as how, where and when they were killed. This information then informs management decisions. Furthermore, observers are the first point of contact with fishers and therefore play an important role in raising their awareness about the urgency to implement effective mitigation measures.

A training programme has been developed to educate observers beyond their general training, to identify the affected species and become aware of the fishery's impacts and the measures available to mitigate the problem. A training manual "A Practical Guide to Understanding and Reducing Vulnerable Bycatch" has been developed both in English

(for distribution in South Africa and Namibia) and in Portuguese (for distribution in Angola and Mozambique). This manual aims to inform fisheries observers, skippers and other interested parties and covers the following topics: fishing sectors implicated; the biology, conservation status and population trends of vulnerable species; available mitigation measures; data collection; handling of live animals and species identification. Additional to the species descriptions, are laminated species identification sheets used to aid under at-sea conditions. Thus far approximately 100 observers have been trained from South Africa, Namibia and Angola.

The situation is quite different in the three countries. In South Africa, observers are required to collect all fisheries data, including



all bycatch data of seabirds, turtles, sharks and mammals as well as on the use and effectiveness of seabird mitigation measures from approximately 10-20% of all fishing trips. In contrast, no formal observer agency is established in Angola. Observers are replaced by "samplers" that collect information on beach landings along the coastline. In Namibia, on the other, all (100% coverage) fishing vessels carry fisheries observers, but it is not mandatory for observers to monitor bycatch of vulnerable species. This illustrates the importance of our educating observers as well as the fishers themselves in order to increase their awareness of the importance and urgency of collecting the relevant data and mitigating mortality where it is unacceptably high.

Education is fundamental to saving our marine life. It is therefore our vision is to empower our fisheries observers to protect our seabirds and in doing so, the sustainability of our fisheries.

"We only conserve what we love,  
We only love what we know  
And we only know what we are taught..."



## BARCODE OF LIFE INITIATIVE: FISH BARCODE OF LIFE

Allan Connell

Imagine if you could have a pocket-sized instrument that could digest a small piece of plant or animal tissue, sequence a particular target strand of DNA, and then search its memory bank of archived sequences to give you a species match, or a most probable genus choice, if your species' sequence is not on file. This is the dream of a group of scientists who have embarked on a bold new initiative, to "barcode" the fauna and flora of the world, using a particular section of a gene, which can be shown to have the sensitivity, in terms of species recognition, that is roughly equivalent to currently used taxonomy, based on morphology. And while the search continues, with some promising leads, for such a gene in the plant kingdom, the gene selected for this initiative, in the animal kingdom, is a particular section of the Cytochrome *c* oxidase I (COI) gene. This is one of the mitochondrial, protein-coding genes, from which approximately the first half of the gene, comprising 648 base pairs, has been selected. Such a length is easy to "grab" with current technology, and thus cheap. Results to date indicate that this COI section is easy to recover from diverse taxa, using a limited set of primers, and has proved effective in distinguishing among closely related animal species from a variety of invertebrate and vertebrate taxa. And while these barcodes separate species, programmes using various rules, also assemble groups of species into evolutionary trees, based on similarities and differences in the sequences. Thus a library of barcodes will provide a powerful new tool to understanding the evolution of taxonomic groups.

The new method is not an alternative to current taxonomy, but is a powerful tool to aid all natural scientists operating in a difficult field. At a June 2005 barcoding workshop at the University of Guelph in Ontario Canada, an example was presented, where six new species of tropical reef gobiid fishes were shown as colour slides. Everyone in the audience with the gift of sight, could distinguish between the six new species. But only the owner of those slides, Rick Winterbottom, could know whether they were new, or whether any of the six species was described in the literature. And very few in the audience, indeed in the world, would have the courage to run any one of the species through a gobiid key, and declare with any confidence, that it was a new species, let alone having access

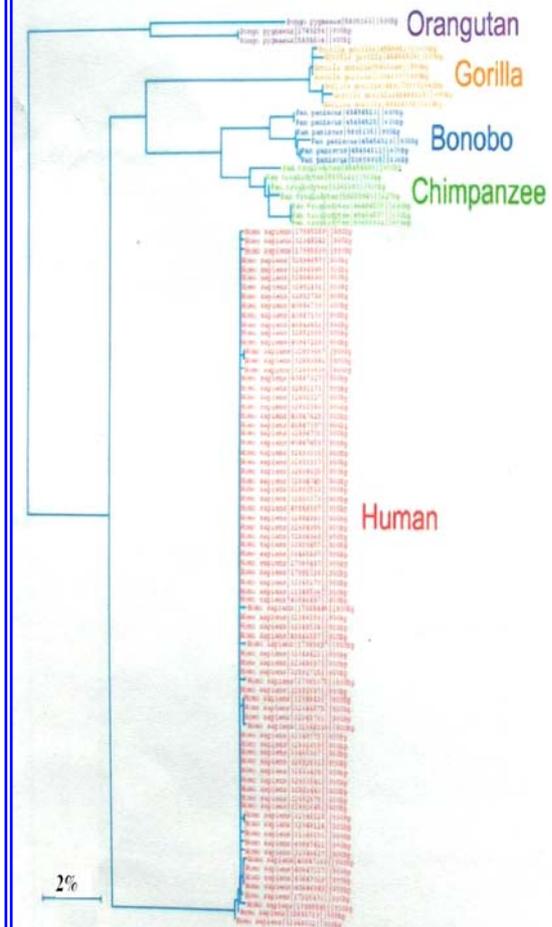
to the requisite literature. But even today, although the Genbank website contains the COI sequences of less than 5% of the world's fishes, any one of us could submit just the tiniest piece of the precious specimen, say for example a clipping of a damaged pectoral fin, to a sequencing laboratory, and within a couple of days the sequence could be compared with Genbank's archives, to see if a match can be found. Because fishes are so important, in so many ways, in world biodiversity and economics, they have been targeted as a flagship project of the barcoding initiative, and it is planned to barcode as many as possible, of the world's estimated 30 000 fishes in the next 5 years. So quite soon, with the help of leading collectors and ichthyologists around the world, we will be searching for matches more confidently, and supplying supportive COI-based information to recognised specialists, on species we have collected, which might be new. In South Africa, my fish eggs and larvae project has given us a bit of a head start, and the sequencing team at University of Guelph in Canada, led by Prof Paul Hebert, has already sequenced about 250 species

of our marine fishes, with material from another 165 species currently being sequenced. All these sequences are being made available for comparison with other species around the world, in Genbank.

Other advantages of barcoding include that the technique can be used on any stage of an animal's life cycle, such as eggs, caterpillars, pupae and adults, requires only tiny pieces of tissue (e.g. a moth leg, or a single rotifer), and can identify otherwise unrecognisable tissues, such as the stomach content of a predator, or a fillet of fish. Another target group of the project, is the world's mosquitoes, for obvious reasons.

In closing, a fun (and reassuring) comparison of the Hominidae, confirms that we are quite

Neighbor-joining tree of genetic distances in COI among and within 100 Hominidae.



well separated from the apes and chimps. Note the length of the 2% bar (difference in sequences), at the foot of the dendrogram. Within a species, this difference is about 0.2%, well illustrated by the human set. Some variation can be seen in the chimpanzees and bonobos, but note the difference between the orangutans of Borneo and Sumatra, confirming the recent recognition of two species.

### Acknowledgements:

In compiling this brief report, I have borrowed extensively from a leaflet issued at the June 2005 Barcoding workshop in Guelph. The leaflet was compiled by Mark Stoeckle of the Rockefeller University, Paul E. Waggoner from Connecticut Agricultural Experiment Station, and Jesse H. Ausubel from the Alfred P. Sloan Foundation. For more information visit <http://www.barcodinglife.org>



## PEOPLE AND PRAWNS IN MADAGASCAR

*Sean Fennessy*

Prawn trawling is a significant fishery in Madagascar, with annual catch by the industrial sector being in the region of 8 000 mt, and a substantial contributor to GDP in that country. Since 1996, a biannual workshop has been held on management of this fishery, to which all stakeholders are invited. In October 2005, the workshop was held in the capital, Antananarivo, and FAO provided funds for attendance by delegates from South Africa, Mozambique and Tanzania. I attended because of my involvement in the management of the South African crustacean trawling industry.

The workshop attracted about 150 participants, and was opened by the Prime Minister of Madagascar and the Minister of Agriculture, Production and Fisheries, signifying the importance of this meeting. There were 31 presentations over the three days, covering a variety of topics, including research, economics, management, eco-certification, security and safety. All sectors of the fishery were represented, notably subsistence/artisanal fishers, whose attendance at the workshop was paid for by the organisers GAPCM (Groupement des Aquaculteurs et Pecheurs de Crevettes de Madagascar – group of aquaculturists and fishers of prawns in Madagascar). This body comprises a group of professional people from the fishery and from mariculture, and is funded by French development aid to Madagascar, as well as by the industry. The subsistence/artisanal catch is substantial, and is thought to be equivalent to the industrial catch. Mariculture is also a significant activity in Madagascar, and production recently overtook the wild catch.

Many of the presentations at the workshop concerned the current troubled state of the Madagascan fisheries, which mirrors numerous prawn fisheries elsewhere, not least in the Western Indian Ocean, where the target and bycatch species are virtually identical to those in Madagascar. Catch rates are dropping, fishing effort needs to be reduced and the industry is less viable owing to increasing petroleum prices and low prawn prices owing to massive increases in Asian mariculture production. It is possible that a system of individual transferable fishing rights (gear units) may be introduced in Madagascar in order to effect the reduction in effort. A delegate from Australia made two presentations on this,

and has been contracted by the GAPCM to inform the local industry about the system applied to the Australian Northern Prawn Fishery, and to facilitate this approach in Madagascar. I presented a brief overview of the South African crustacean trawl fishery, and my work on bycatch reduction devices in particular elicited interest from French researchers in this field. I also established useful contacts for projects proposed under the South West Indian Ocean Fisheries Programme (SWIOFP).

Merci beaucoup à FAO et GAPCM!

## AN INVENTORY OF LONG-TERM ENVIRONMENTAL DATASETS IN SOUTH AFRICA

*Silvia Mecenero*

The South African Environmental Observation Network (SAEON) has been implemented to establish long-term monitoring of environmental indices, understand ecosystem function, monitor environmental and land use changes, and determine the impact of these changes on the human society of South Africa. SAEON is a National Research Foundation (NRF) initiative and is funded by the Department of Science and Technology (DST). SAEON has international links with similar projects, namely the Long Term Ecological Research sites (LTER) and the Environmental Long-Term Observatories of southern Africa (ELTOSA).

Field centres or nodes, established across the range of habitat types or biomes in South Africa, shall be responsible for monitoring these changes. While a number of new environmental monitoring projects are to be instigated, there are many existing studies, while some relevant projects are lying dormant. In order to determine which environmental datasets already exist, their status and their value in terms of SAEON's objectives, information regarding them is needed. Therefore, one of the aims of my SAEON-supported post-doctoral fellowship is to create an inventory of long-term environmental datasets (active as well as dormant) existing in South Africa. Datasets of relevance include comprehensive baseline studies covering any aspect of the environment, such as flora and fauna, climate, geology, water, soil, oceanography, land-use, socio-economics, etc. The inven-

tory shall be in the form of metadata.

What is metadata?

The metadata of a dataset is not the data itself, it merely describes the data within. As a simple analogy, the information on a label of tinned food represents the metadata of the product (e.g. manufacturer, mass, ingredients).

**The kind of metadata that I am collating includes the following:**

- Contact(s) for the dataset (e.g. name of the organization and contact details of the person in charge of the dataset)
- Dataset information (e.g. title, brief description, purpose, keywords, key publications, temporal and spatial coverage, whether the dataset is dormant or active, digital or non-digital)
- Data quality (e.g. a description of how accurate are the data, what gaps exist)
- Access and use of the dataset (e.g. access/use constraints and conditions, how to get a copy of the dataset, how to cite the dataset)
- Metadata author details (contact details for the person who produced the metadata)

To assist you in providing me with metadata for your long-term datasets, I have created a user-friendly 'metadata form' for you to complete. You can obtain a copy directly from [smecener@adu.uct.ac.za](mailto:smecener@adu.uct.ac.za) or you can download it from the metadata project website (<http://web.uct.ac.za/depts/stats/adu/saeon.htm>).

The metadata database shall be made available on the SAEON website as a search interface, thereby assisting researchers (local and international) in locating datasets of interest and establishing contact with the owners/managers of the data. Potentially, collaborative studies can be formed in this way.

SAEON invites individuals or institutions carrying out long-term environmental research to consider joining the network. This will facilitate the coordination, administration, sharing and use of long-term datasets on a national scale, and help secure the datasets for posterity. To find out more about SAEON, go to their website (<http://www.saeon.ac.za>).



## SADCO TO ARCHIVE MARINE BIOLOGICAL DATA FROM AFRICA

*Marten Gründlingh*

The **Southern African Data Centre for Oceanography** (SADCO) has been contracted to establish and host a major marine biological data base for sub-Saharan Africa. This initiative forms part of OBIS (**Ocean Biogeographic Information System**), which in turn is the marine component of the **Global Biodiversity Information Facility** (GBIF) and the data management component of the **Census of Marine Life** (CoML), a global programme to determine the biodiversity status of the world's oceans.

OBIS is already the largest and most authoritative, on-line, global database for marine biodiversity data and continues to expand rapidly. By the end of 2004 the system contained over 5 million records of over 40 000 species (five times the number one year previously) and the system is on schedule to reach 6 million records in 2005. The aim is to become the primary source of data on distribution of marine species worldwide and to provide sophisticated online mapping and analysis tools (such as correlation of distribution to environmental parameters), making the system a fundamental tool for societal and governmental decisions on how to harvest and conserve marine life, as well as a potent tool for educational use.

The global OBIS effort has been rolled out through seven regional "nodes", each one collating data from organisations and data providers within a specific "target area". Data will be loaded onto a database established and hosted by the regional node, but also regularly uploaded to the global node at Rutgers University, USA. The name chosen for the African node is **AfrOBIS** and its target area agrees more or less with the SADCO target area (10° N to 70° S; 30° W to 70° E, extending from Senegal in the west to Somalia in the east, including islands).

Data submitted to OBIS will be made freely available to all users. Requests for output data can be submitted on-line to the regional node website, and a global answer will be provided virtually immediately.

### Present status of AfrOBIS (October 2005)

- The web-site has been established (afrobis.csir.co.za:8000).
- The data provider software has been

installed and activated. This will allow the international OBIS to search through regional nodes' databases at regular intervals, and upload data to the central server (this is required to expedite global searches).

- Software, to load data onto AfrOBIS, has been written.
- Descriptive information on AfrOBIS has been installed on the international OBIS server.
- Two temporary digitisers have been appointed at Iziko Museum, Cape Town, to assist with the digitisation and entering of the data held by that organisation, and transfer of these data to AfrOBIS.
- Data have been received from SAIAB (South African Institute for Aquatic Biodiversity), and are being prepared for loading.
- The Natal Museum has agreed to supply data to AfrOBIS.
- Acquisition of data from other museums, herbaria and research organisations is being negotiated.

### Future plans and how you can help

The process of identifying other data providers from both South Africa and (especially) the rest of Africa remains our highest priority. Those organisations with substantial amounts of data (as reported during the 2003 CoML workshop in Cape Town) have been identified, and are in the process of being contacted.

Two workshops of ODINAfrica (Ocean Data and Information Network for Africa), sponsored by the Flemish Government, have been held (Ostende, Mauritius) and the attendants from many African countries will be contacted for local biodiversity data. As such, AfrOBIS has the support of ODINAfrica.

Organisations in South Africa and Africa (within the target area), as well as scientists involved with large programmes (e.g. the Benguela Current Large Marine Ecosystem

programme, MCM, CSIR, ORI) that have marine biodiversity data are invited to contact either Prof Charles Griffiths (Chair of the Africa Committee of CoML, griffith@egs.uct.ac.za) or Dr Marten Gründlingh (manager of SADCO and AfrOBIS, [mgruindli@csir.co.za](mailto:mgruindli@csir.co.za)), to arrange the submission of their data.

### Requirements to contribute data

- The main requirement of data providers is that they should be prepared to share their data openly with colleagues all over the world.
- The data should be captured with a **lat/long position** (this seems to be one of the single issues that has held back previous digitisation. Often observations are reported as having been located "Off Danger Point", or "5 miles west of Hondeklop Bay").
- The requirements of the data scope/format can be obtained from Ursula von St Ange ([uvstange@csir.co.za](mailto:uvstange@csir.co.za)).

### Advantages of OBIS

It is believed that the decrease in biodiversity globally is a serious challenge to humankind, making it of prime importance to establish a baseline of the present status of biodiversity. It has been demonstrated that the amount of marine information emanating from the African continent is quite meagre, especially in the light of the extensive biodiversity thought to occur in this region. A special effort is therefore required to ensure that relevant marine information is captured and made available to scholars and decision makers.

AfrOBIS is our window of opportunity to make an impact on this availability of information.

*AfrOBIS data will be compatible to data internationally. For the first time, the extent of common occurrences of species on a global scale will be available at our fingertips virtually immediately. OBIS will represent a **powerful, global tool** to all students of marine biodiversity.*



## CORAL MOLECULAR BIOLOGY WORKSHOP IN THE ALOHA STATE

*A.H.H. Macdonald*

In August of this year, I was lucky enough to be one of seven students attending a workshop on coral molecular biology techniques held at the Hawaiian Institute for Marine Biology (HIMB) on Moku O Lo'e (Coconut Island) in Kaneohe Bay on the east shore of Oahu. This is the main island of the Hawaiian archipelago, where the majority of the population lives. The Hawaiian island archipelago is the most isolated island chain in the world and has been compared to a natural experiment in ecological "island" theory. The relatively low species diversity in its near-shore marine environment is a testament to its isolation. In this unique and beautiful

setting the HIMB has developed a leading coral-orientated molecular research team.

The workshop was held on Coconut Island from the 15<sup>th</sup> to

the 26<sup>th</sup> of August and encompassed a wide range of molecular biological methods specific to hard coral, ranging from basic DNA isolation to gene expression. The workshop was taught and demonstrated by researchers experienced in the field of coral molecular biology. Brian Bowen and Rob Toonen are population geneticists who have worked on marine vertebrates and marine invertebrates, respectively. Ruth Gates lectured on coral symbiont analyses and host-symbiont interaction and Teresa Lewis lectured on her speciality, cellular function and gene expression.

The field of coral molecular biology is in its infancy and developing rapidly. Standard techniques for assessing relationships amongst genera such as the use of mito-

chondrial DNA, have proved to be of little use with unusual or slow evolutionary rates in coral DNA. In fact, many of the techniques developed in other taxa and applied to corals have been found to be ineffective and, thus, new methods are being developed.



chondrial DNA, have proved to be of little use with unusual or slow evolutionary rates in coral DNA. In fact, many of the techniques developed in other taxa and applied to corals have been found to be ineffective and, thus, new methods are being developed.

With these challenges in mind this team of innovative scientists from the field of molecular biology have been assembled at the HIMB. The result has been the development of laboratory facilities rivalling any marine biological institute in the world and a research program with broad scope ranging from the basics of cell function to population dynamics.

The course itself proved to be very rewarding. It focused on the practical application of the techniques as these tend to present a number of unforeseen challenges. All of the methods taught and discussed were practiced in lab sessions in the teaching laboratory. The hands on approach meant that the numerous challenges encountered were dealt with comprehensively. The experience gained in this workshop has equipped me better to study this exciting, virtually unexplored branch of coral reef science in the western Indian Ocean.

Corals are marine invertebrates with a free-

swimming larval stage in their life cycle and it is possible that larvae may disperse great distances thanks to transport mechanisms such as ocean currents. The study of population dispersal in corals is difficult by any means other than genetic analysis. These molecular methods are readily applied in the evaluation of population viability and connectivity necessary for the sustenance of genetic diversity of reef coral populations. Molecular methods are, thus, important tools in the construction of marine protected areas which will adequately preserve the genetic integrity of these irreplaceable resources.

I am most grateful to the Oceanographic Research Institute, the National Research Foundation and the Western Indian Ocean Marine Science Association for their financial assistance without which I would not have been able to attend this most valuable workshop.

## JOINT ECO-UP-EUR-OCEANS UPWELLING SYSTEMS

**WORKSHOP, 26-30 SEPTEMBER 2005, CASABLANCA, MOROCCO**

*Jenny Huggett*

Eco-Up, shorthand for Upwelling Ecosystems, is a French-driven research programme on the "Structure and functioning of exploited upwelling ecosystems: comparative analyses within the framework of an ecosystem approach to fisheries". A key component is the comparative approach between the Benguela, Humboldt and Canary upwelling systems, and Eco-Up succeeds the bilateral French/South African programme IDYLE which focused solely on the Benguela system. EUR-OCEANS is one of the EU marine science programs within the "European Network of Excellence" (see [www.eur-oceans.org](http://www.eur-oceans.org)), and Eastern Boundary Upwelling Systems (UP) is one of seven categories of ecosystems within this network. In hazy Casablanca, the city of multitudinous satellite dishes, approximately 70 delegates attended a 5-day joint workshop on areas of common interest to both research units. Most participants (>70%) were from Morocco and France, with the remainder from Peru, Chile, Spain, Portugal, South Africa, Senegal, Mauritania, Angola, Mexico and USA.

The most challenging aspect of the workshop for many was language; presentations and discussions were conducted primarily in French, the most widely understood lan-



guage. Delegates were requested to provide PowerPoint slides in English where possible, but insufficient text in some presentations resulted in rather blank faces, and rapid French discussions left many with glazed expressions. My high school French



*Casablanca skyline, showing the impressive Hassan II Mosque*

was pushed to new limits!

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The first half of the workshop was devoted to five **Scientific Themes** of interest to both Eco-Up and EUR-OCEANS: (1) Coupling climate-atmosphere-physics-biogeochemistry; (2) Coupling biogeochemistry-production; (3) Trophic Ecology in upwelling systems: trophic interactions, models and indicators towards an ecosystem approach to fisheries; (4) Plankton, fish and fishers behaviour; (5) Bio-economy (this theme not covered by EUR-OCEANS).

A half-day session was devoted to **EUR-OCEANS**, and a whole day to plenary sessions on the four different **Upwelling Ecosystems**: African Canary, Iberian Peninsula, Humboldt and Benguela.

The last morning was spent on the **Comparative Approach**, which included two extremely informative presentations on the California Current system, and the **Web-based Atlas project**, which aims to produce an animated, synthetic and comparative display of the ecosystem dynamics: environment, biology, ecology and exploitation. The last afternoon was restricted to administrative, practical and organizational aspects concerning Eco-Up/IRD staff only.

Three presentations were made during the **Benguela session**. I gave an overview of the Benguela ecosystem, describing some of the main characteristics of the oceanography and environmental variability; Antonio da Silva reported on zooplankton biomass patterns in the vicinity of the Angola-Benguela frontal zone, as detected by a lowered ADCP, and Laurent Drapeau gave a comprehensive presentation of methodological approaches and tools towards an ecosystem approach to fisheries in the Benguela.

This included recent progress and ongoing development of hydrodynamic models (ROMS, RIBA, SAFe), Lagrangian individual based models (IBMs), remote sensing, NPZD models, ecosystem models and ecosystem indicators. These all contribute towards the goal of developing an Ecosystem Approach to Fisheries (EAF) for the Benguela. The Benguela session concluded with a general

discussion, including the identification of gaps in our knowledge and future approaches. Whereas knowledge of the physics and higher trophic levels are considered to be quite advanced, linkages of both of these with the lower trophic levels, particularly zooplankton, are considered to be relatively weak. This was highlighted as an area for future emphasis, in particular with respect to input into ecosystem models.

Future work within Eco-Up will focus more intensively on the northern Benguela, in particular with respect to trophic and ecosystem models. Ocean circulation modelling efforts will focus on the influence of the Agulhas Current, the Agulhas Bank, St Helena Bay, Benguela Niños and the Angola-Benguela Front. The TAPS multi-frequency acoustic profiling system will be deployed in the Benguela system in 2006 in order to test its efficacy in characterising local zooplankton communities.

Personal highlights of the workshop included the presentations by Francisco Chavez (MBARI/USA) and Tim Baumgartner (CICESE/Mexico) on the Californian system, which has been studied since the 1930s; the advances made in multi-frequency acoustic identification of zooplankton, presented by Anne Lebourges-Dhaussy (IRD/France); and a presentation on diel 3D spatial patterns of pelagic fish in relation to sub-mesoscale oceanographic features (internal waves) in the Humboldt system, presented by Arnaud Bertrand (IRD/France/Peru). Challenges of the meeting included the language problem, insufficient time allocated to discuss future collaboration, and the lack of alcoholic beverages at the final workshop dinner. Overall, however, the workshop was a great success and an extremely rewarding experience.



*Team Benguela: Laurent Drapeau (IRD/MCM), Jenny Huggett (BEP/MCM) & Antonio da Silva (BENEFIT/INIP)*

The date and venue of the next meeting have still to be finalised, as has the question of whether it will again be a combined Eco-Up-EUR-OCEANS workshop. In the interim, interested parties are invited to register for "The Humboldt Current System: Climate, ocean dynamics, ecosystem processes, and fisheries" – an International Conference to be held in Lima, Peru from 27 November to 1 December 2006.

For more information please visit <http://irdal.ird.fr/hcs-conference.imarpe.fao.ird.php3>

Abstract submission deadline is 15 May 2006.



**FIRST INTERNATIONAL MARINE PROTECTED AREAS CONGRESS (IMPAC 1)  
DEAKIN UNIVERSITY, GEELONG, AUSTRALIA  
OCTOBER 2005**

*Impressions from Mandy Lombard*

About 700 delegates attended IMPAC. As one would expect, an overwhelming majority were Australians, but about 80 countries were represented. Africa was noticeably underrepresented, and to my knowledge, only three South Africans were there: Bruce Mann from ORI, myself (I gave a poster), and Belemane Semoli from MCM (he gave the talk prepared by Deon Nel from WWF-SA). Please forgive me if I have missed any other South Africans. Of the 700 delegates, about 360 gave either oral or poster presentations (roughly equally split). It was great to catch up with two "old" South Africans: Lynnath Beckley (now Associate Professor at Murdoch University in Fremantle, Western Australia), and Colin Buxton (Director of the Tasmanian Aquaculture and Fisheries Institute). Both appear to be doing very well in their respective positions.

**The Congress addressed five themes and four crosscutting issues:**

**Five Themes**

1. Sustainability/Resilience
2. Developing MPA networks
3. Ecosystem Processes
4. Effective Management Shared Stewardship

**Four Crosscutting Issues**

1. Fisheries
2. Indigenous and local communities
3. Social and Economic Regional/High Seas

Owing to the broad nature of these themes and issues, there was quite an institutional/political/legal flavour to the Congress. This offered opportunities to get an insight into the implementation aspects of MPAs. The real hard science issues were dealt with mainly by the Sustainability/Resilience and Ecosystem Processes themes, and it was interesting to meet the big names and hear about their projects. There seemed to be a bias, however, in who was given slots to speak or present posters. Like I said, Africa appeared to be underrepresented; whereas I must have heard a zillion talks on the Great Barrier Reef (30% has recently been declared "no take"). Nonetheless, being there was a very good and useful experi-

ence, and I list some of the highlights below.

**Keynote speakers**

1. Achim Steiner (Director General of IUCN)
2. Ian Kiernan (Chairman and Founder of Clean up Australia, and many other things)
3. Dr Sylvia Earle (Explorer in Residence, National Geographic Society, and many other things too)

Totally riveting would be the best description of the three keynote presentations. Achim Steiner spoke with exceptional eloquence, and passion, on arrogance versus ignorance in today's world, and the need for the global community to trust the curators of our natural resources (for example, when warnings are given regarding over-exploitation). He discussed the fact that "we at the end of a 50 year fishing spree", and that "there is a transition from target stock, to ecosystem management". Apparently he could have delivered the presentation equally well in at least five other languages!

Ian Kiernan (also a yachting note) holds many offices and has earned many environmental awards. He had the audience spellbound with the history of how he started the Clean up Australia campaign, which has now grown into the Clean up the World Campaign. He is a fantastic example of what ONE person can do .....

Unfortunately I missed Dr Sylvia Earle's presentation, but the reports I got where what one would have expected: "A fantastic lady", "she didn't mince her words regarding the effects of fishing and especially trawling on marine biodiversity", etc.

**Film night**

The entire Congress as well as the local public were treated to an evening of marine film clips from six accomplished underwater filmmakers. South Africa can be proud that our very own Charles Maxwell was amongst the chosen six, and his, as well as the other film clips, were absolutely fantastic! Well done Charles.

**Presentation highlights**

My time was spent mainly in the two research-based themes, Sustainability/Resilience and Ecosystem Processes. Unfortunately these two themes were housed in different buildings on different parts of the campus, which made session hopping impossible. Consequently, I missed many talks that I really wanted to attend. Highlights for me were:

Callum Roberts. He explained that resilience within an MPA means three things. It means that there is a full species complement, that there are big enough populations of the species, and that there is connectivity in space and time. He showed a triangle that represented ocean area, and MPAs represented the tiny top corner of the triangle. He stressed that we need to change this situation, so that MPAs form the base of the triangle, and that 20-40% of the sea needs to be protected if we want to maximise fisheries benefits. At this point I think it is important to differentiate between the role that MPAs play in fisheries benefits, versus biodiversity protection. The two are often confused. Callum was speaking particularly about fisheries benefits.

Gary Russ. Gary's title was "No-take reserves increase abundance and biomass of reef fish on inshore reefs of the Great Barrier Reef Marine Park". He presented 20-30 years of data to show export effects (spillover of adults and recruitment of larvae) of MPAs on surrounding areas. He concluded that "this is the most convincing evidence to date that the management zoning of the world's largest marine park has been effective, at least for coral trout on inshore reefs".

For those of you who read MPA news ([www.mpanews.org](http://www.mpanews.org)), there is an article in the November issue summarising Louisa Wood's presentation that shows that at the current rates of global MPA declaration, the 2012 targets set at the World Parks Congress will be met only in 2085.

Other highlights included discussions of Antarctic protection (particularly a presentation by S. Grant), high seas protection (particularly presentations by K. Gjerde and K. Juniper) and some good MPA planning work (L. Beckley, A. Friedlander, J. Ardrone)



and H. Alidina to name a few).

In general, I felt that the fisheries effects of MPAs were well researched and presented, but that the biodiversity values of MPAs received less attention. Also, the MPA planning community still has a way to go in defining and quantifying (i) biodiversity patterns, (ii) biodiversity processes, and (iii) threatening processes. They can learn a lot here from the terrestrial planners, and I feel that more correspondence is required among marine, other aquatic and terrestrial planners.

The Congress website carries the following summary:

"One of the most encouraging outcomes of IMPAC 1 was the unanimous view from both the fisheries representatives and marine protected area specialists of the mutual necessity to work collaboratively. The value of the 'historic' knowledge held by local communities was recognised along with the importance of early community inclusion and co-management options.

There was general acceptance of the need to go with the best scientific information you have (whilst still seeking to improve knowledge = "moving whilst improving") rather than wait for 'perfection' and that it was essential to build-in flexibility to cater for unforeseen changes. Progress towards High Seas MPAs was welcomed."

#### Acknowledgements

I thank the Marine Biology Research Institute of the University of Cape Town for co-funding my participation at IMPAC.

#### Congress details

IMPAC 1 was co-hosted by the World Commission on Protected Areas (WCPA), Parks Victoria, and the Great Barrier Reef Marine Park Authority (Australian Government). It was further supported by the Australian Fisheries Management Authority (Australian Government), the Department of the Environment and Heritage (Australian Government), and the World Conservation Union (IUCN).

The website is [www.impacongress.org](http://www.impacongress.org) (all abstract will be posted here at the end November 2005).

### REPORT BACK ON 37<sup>TH</sup> EXECUTIVE COMMITTEE MEETING OF THE SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH (SCOR) IN CAIRNS, AUSTRALIA (29 AUG – 1 SEPT 05)

*John Compton*

I attended the Executive Committee Meeting of the Scientific Committee on Oceanic Research (SCOR) in Cairns Australia (28 August – 1 September 2005) as a national member of South Africa's Scientific Committee on Oceanic Research. Also at the meeting from South Africa was Prof John Field (UCT Zoology Department and a past President of SCOR) in his role as Chair of the GOOS (Global Ocean Observing System) scientific committee and member of the scientific steering committee of GLOBEC (Global Ocean Ecosystem Dynamics).

I very much enjoyed the meeting because it provided a thorough overview and update on the activities of SCOR and other international organisations (many with links to SCOR) and how these activities are shaping and directing coordinated ocean research projects. The ever-expanding list of acronyms can be a bit daunting at first and some say we are rapidly approaching saturation, but it is very clear that these organisations play a critical role in getting large-scale ocean science initiatives underway. The driving principle behind SCOR is to promote the best, cutting-edge science. Ours is the blue planet with 71% ocean and understanding how the ocean interfaces with the other spheres is essential to our anticipating natural events and human impacts. This was underscored by the recent (26 December 2004) Indian Ocean tsunami and hurricane Katrina which was bearing down on New Orleans during the SCOR meeting.

The first half of the meeting reviewed existing SCOR working groups and evaluated the proposed working groups for funding starting in 2006. The second half was largely centred on the relation of SCOR to other intergovernmental and nongovernmental organisations which have an overlapping interest in ocean science to see where those ties could be strengthened, particularly in areas needing scientific expertise. I was struck by the quality of on-going SCOR working groups that had, with relatively modest funding (most receive on the order of \$15,000/year/meeting), put together timely and relevant syntheses of key aspects of ocean science. For example, the biogeochemistry of iron in seawater working group greatly improved the reproducibility of iron measurements in seawater and to the proposal of GEOTRACES to

increase our understanding of trace metals in ocean systems. A 'fast-track' initiative on the oceans in a high CO<sub>2</sub> world was also very successful highlighting the observed changes in ocean chemistry which can have a potential large impact on marine ecosystems. The oceans have taken up approximately one-third of anthropogenic CO<sub>2</sub> and this has resulted in the acidification of the surface ocean with significant changes in pH. We learned of the current threats to the Great Barrier Reef just offshore of Cairns as well as to other reef tracks globally of increased coral bleaching from warmer surface waters and replacement of coral by algae in stressed reefs with increased nutrient input from coastal developments. The overgrowth of coral reefs by algae may provide a large sink for atmospheric CO<sub>2</sub>, but is not desirable for tourism and other products derived from the reefs.

Two Working Group proposals were recommended for funding in 2006: "Thermodynamics and equation of state for seawater" critical to fundamental calculations in the ocean such as the temperature at which sea ice forms, and "Natural and human induced hypoxia (low oxygen content) and consequences for coastal areas" which is particularly relevant to the highly productive western margin of southern Africa where hypoxia and anoxia are common. Pedro Monteiro (CSIR, Stellenbosch) is a proposed member of the hypoxia WG. One of the suggested 'hot topics' for a future SCOR working group is an interdisciplinary approach to the dynamics of the shelf/slope break.

The committee made clear its interest in expanding the membership of SCOR with a strong emphasis on more representation/participation from Africa. South Africa is currently the only member nation (Egypt is in arrears and may soon be dropped for lack of any response). Therefore, there is interest in getting coastal nations such as Nigeria, Mozambique, Angola and Namibia to join SCOR. SCOR has a sliding scale for membership dues and it appears that the biggest obstacle to developing nations joining is not money as much as it is availability of ocean scientists. Therefore, a big push is toward capacity building and to offer postgraduate training schools as well as fellowships to scientists from developing countries to travel to laboratories for training and education. The school



at Conception (Chile) has been successful and there is interest in developing similar schools in SE Asia, South America and Africa. ICSU (International Council of Science) held its first African regional meeting in 2004 and intends to set up a regional African office to promote participation. Funds are generally available and African scientists need to be alerted and encouraged to take advantage of these opportunities.

SCOR has strong links to PAGES (Past Global Changes) and IMAGES (International Marine Global Change Study) that focus on reconstructing past climates from the geological record. John Rogers and I have been active in IMAGES over the years and want to continue South Africa's involvement. I had several discussions with Prof Ralph Schneider, the current director of IMAGES from Kiel Germany, on increasing involvement in southern Africa. There are often positions available on ocean cruises for scientists and students to gain experience and to obtain material for study from these cruises. The best approach is to make contact with the chief scientists of an upcoming cruise directly to see what arrangements can be made for shipboard participation. John Rogers and I are currently trying to put together a South African committee for IMAGES, and request that people interested in the marine sediment record to please contact us.

#### Other linkages include:

**CoML** (Census of Marine Life) a decade-long project to understand the abundance, distribution and diversity of marine organisms,

**GOOS** (Global Ocean Observing System) with important practical applications such as installation of an early tsunami warning system for the Indian Ocean,

**SOLAS** (Surface-Ocean Lower Atmosphere Study) has proposed a fast-track International Nitrogen Initiative that highlights recent advances in the nitrogen cycle,

**SCAR** (Scientific Committee on Antarctic Research) is promoting the upcoming International Polar Year,

**ECOR** (Engineering Committee on Oceanic Resources) has a working group on ocean carbon sequestration,

**GEOHAB** (Global Ecology and Oceanography of Harmful Algal Blooms) is chaired by Grant Pitcher of Marine and Coastal Management (Cape Town) and had a number of activities in 2004/2005 including a meeting on HABs and stratification.

**GEOHABPOGO** (Partnership for Observation of the Global Ocean) is developing a database of research cruises useful to students looking for opportunities to participate.

There are many other organisations, the details of which (or links) can be found on the SCOR web site [www.jhu.edu/scor](http://www.jhu.edu/scor). SCOR is in good financial health and is looking to increase the diversity and amount of funding it receives.

I thank the NRF for travel funds and UCT for leave time to attend this important meeting.



## STUDENT'S CORNER

### GREAT WHITES *Lee-Ann Jacobs*

Many people tend to think that sharks, particularly the great white, are these terrifying, vicious monsters. People have a negative attitude towards these misunderstood creatures as a result of movies such as "Jaws", but also as a result of the large amount of shark attacks that have been occurring along the South African coast, especially the west coast. Shark attacks are rare, in comparison to how many people get injured in car accidents or get mugged on a daily basis.

Sharks are known for being one of the most aggressive and fiercest predators (Van der Elst and King 2000). However, sharks especially the great white, are not as repugnant as the media makes them out to be. The main preys of the great white sharks are pinnipeds (seals, sea lions), but they also feed on smaller sharks and other fish. Great white sharks are a natural part of the predatory-prey cycle and are important in maintaining balance in the environment.

The great white shark should not be persecuted because it plays a major role in the ecosystem (Van der Elst and King 2000). Sharks are very important because they regulate the seal populations. If sharks were to be utilised commercially by the fishing

industry, then the implications of that would have a colossal impact on the ecosystem. It would directly affect the food chain and have a top-down effect on the ecosystem. This implies that if there were fewer sharks to control the seal populations then the seals would increase in number.

In turn this would have a direct effect on the stocks of commercial pelagic and demersal fisheries, namely fish stocks such as mackerel, and juvenile hake. The fishing industry would be effected dramatically and suffer great losses as a result of the increased seal population feeding on these fish. Therefore it would make no sense to harvest sharks, especially great white sharks, because the price of over-fishing these predators would cost more than its worth.

Much more research has to be done on the behaviour of these fascinating creatures (great white sharks) and also their importance and impact on the ecosystem. There is a need for people to change their mindsets about the great white, and start protecting this priceless resource before it is too late.

**REFERENCE** : VAN DER ELST, R.P. and D. KING 2000 – Everyone's Guide to Sea Fishes of Southern Africa. Cape Town; Struik Publishers: 112 pp



# STUDENT'S CORNER

## STUDIES ON THE MOVEMENTS OF JUVENILE INSHORE LINEFISH: FILLING IN THE GAPS

*Peter Watt-Pringle*

The marine environment makes it difficult to keep track of animals under study by scientists. We are very rarely able to keep our subjects in sight for extended periods due to the physical shortcomings of being terrestrial animals ourselves, and so we are limited to "snapshot" views of our study subject's life. Technology, however, has helped us improve our abilities to study marine organisms – we have aqualungs that allow us to enter shallow ocean habitats for limited periods and submersibles that can take us to deeper habitats, as well as Remotely Operated Vehicles carrying cameras that we can manipulate from the surface.

We now utilise tags that record the whereabouts of an animal over time in internal computer chips, which can then be accessed upon recovery. We can also set up listening stations to record acoustic signals from transmitters surgically implanted in an animal for relatively long periods. Such technological sophistication is still very expensive. Furthermore, limiting the number of individual animals that can be studied does not provide scientific rigor. Acoustic telemetry technology also does not allow us to tag and track very small animals. Even the more conventional methods of tagging are limited in terms of the minimum size of a fish that can be tagged.

So, whilst long-term tagging studies have yielded important information on the movement behaviour of the adults of many of our linefish, we have little data on the movements of the smaller size classes (less than 250 mm TL) for these species. We know that in many cases adult individuals show extreme site fidelity, often being recaptured within less than fifty metres of their original capture site a number of years after they were tagged.

The sparids blacktail (*Diplodus sargus capensis*), zebra (*Diplodus cervinus hottentotus*) and white musselcracker (*Sparodon durbanensis*) are three inshore reef-dwelling species that show this movement behaviour, although white musselcracker undertake long distance movements with increasing size (most likely related to their reproductive biology). All three of these species are important components of coastal fisheries in South

Africa. Their juveniles make use of shallow subtidal reefs and the intertidal zone as nursery areas, occurring in intertidal rockpools in significant numbers before moving back to the subtidal zone with increasing age and size.

The use of intertidal rockpools by juvenile fish offers a unique opportunity to study their movement behaviour during this early life history stage. Rockpools that are connected at high tide periods allow for potential movement of fish between them. But when the pools are completely isolated from each other at low tide periods they become discrete sampling sites, where the problems of immigration and emigration during sampling experienced in many mark-recapture studies are overcome. Fish in a number of neighbouring pools can be differentially marked whilst the pools are isolated and then re-sampled after high water periods allow for potential movement to other areas, to get an idea of their movement patterns in this habitat.

We spent a couple of months testing various methods of capturing juvenile sparids in rockpools – baited traps, lift nets and hand netting, before finally deciding to use ultra light tackle (size 18 and 20 barbless hooks) on rod and line (in much the same way as you see kids fishing for bullies in rockpools). After examining the literature it was decided that the most practical tagging method was to use elastomer tags. Northwest Marine Technologies from the USA produces VIE (Visual Implant Elastomer) tags that are injected into transparent tissue as a liquid which then cures into a solid mark. A number of studies have shown the suitability of this method for long-term marking of small fish. VIE tags are available in fluorescent colours that enable *in situ* sampling of marked fish at night under blue light.

The fish are anaesthetised prior to the tag being injected into the tissue alongside the caudal fin rays (the only suitable body location we have found for marking these species). The major limitation of using this tagging method is that only a limited number of individuals can be uniquely marked using two colours and two tag positions in the caudal

fin, so fin clipping will also be used in conjunction with the VIE tags. We have found that we can only accurately carry out the procedure on fish longer than 60 mm TL so this has set the lower limit to the size of fish to be used in our studies.

Using this marking system we aim to investigate the site fidelity of marked individuals in particular pools, as well as their movements to neighbouring pools at a range of distances from their home pool, by repeated sampling after potential movement between pools at high tide could have occurred. From preliminary pilot studies, where juvenile blacktail were marked in a particular pool and some individuals re-sighted in the same pool after several months, we suspect that the juveniles are resident in particular pools, or groups of closely spaced pools, as has been shown for resident intertidal species (that complete their entire life cycle in the intertidal zone) such as a number of clinid (klipvis) and goby species.

This would mirror what is known of the movement behaviour of the adults of many of our reef-dwelling sparid species that utilise limited home range areas for extended periods. We also intend to perform homing experiments using individual fish. These will be uniquely marked and moved to pools distant from their "home" pools. It will then be seen whether they are able return to their home pools and if so from what displacement distance this occurs. This behaviour has also been demonstrated for a number of resident intertidal species, so it will be interesting to see whether the transient juvenile sparids are also capable of this.

Why do we want to know about the movement potential of the juveniles of these species? Well we know that the adults of these species can be extremely resident, with blacktail and zebra in particular showing long-term site fidelity. This makes them suitable candidates for closed area protection through the establishment of no-offtake marine reserves and marine protected areas (MPAs). It is important that we also know the potential for MPAs to protect juveniles of these species. The movement potential of the juvenile life history stage is also important when considering the potential for MPAs to



enhance abundance of fish in adjacent areas open to fishing through spillover and seeding effects.

There is increasing evidence that the potential for larval export from reserves may not be as great as previously thought, due to local retention of fish eggs and larvae by inshore current features and late-stage larval fish swimming abilities. If the juveniles are also highly resident then in many MPAs we may be looking at a closed system where the protected population in the MPA largely reseeds itself and does not contribute a large number of recruits to the populations outside its boundaries. Alternatively there is a possibility that juveniles may move large distances along the coast prior to recruiting to inshore adult populations, so even if self-seeding through oceanographic features predominates in a particular MPA there may still be large spillover potential through juvenile emigration. We can only start to examine these possible scenarios once we have an idea of the general movement patterns of a particular species in these early life history stages.

Knowledge of the movement patterns of the early juveniles of these species will also be important in terms of understanding the potential impacts of coastal pollution on recruitment to the adult population for these species, both inside and outside of MPAs. If we find that juveniles are resident in intertidal areas we can look at conducting studies to examine abundance of juveniles in relation to adult abundances, and possibly even genetic studies on their relatedness to potential adult source populations, in order to examine the question of potential reproductive export from MPAs.

Hopefully the results obtained from our studies will fill in an important gap in our knowledge of the ecology of three important fishery species, which will help us manage them sustainably from both a conservation and human resource use perspective. The next big question will likely be to find out what happens when the juveniles leave their shallow water nursery areas and recruit to the inshore adult population. A particularly challenging task will be to try and quantify the movements of these species whilst still in the larval stages. In so doing we may be able to gain an almost complete picture of the movement patterns and habitat use of these species throughout ontogeny.

My research is being carried out under the supervision of Dr Paul Cowley from the South African Institute for Aquatic Biodiversity (SAIAB), with funding generously provided by SAIAB, Rhodes University and Marine and Coastal Management.

Rhodes University & SAIAB  
Email: g99w1018@campus.ru.ac.za

### STUDENTS, JOIN THE SAEON STUDENT NETWORK!

*Silvia Mecenero*

The SAEON graduate student network is aimed at graduate students involved in, either part-time or full-time, Masters, Doctoral or Post-Doctoral research projects within the broad field of long-term environmental research. The network will allow students to network with each other and with international Long-Term Ecological Research (LTER) students.

The idea of the network developed when three graduate students, ambassadors of South Africa's LTER Programme – SAEON, attended the First International LTER Graduate Student Collaborative Research Symposium in Oregon, USA in April this year. The symposium succeeded in bringing together and networking just over 60 graduate students from 34 different LTER sites across the globe, among them eight International Long-Term Environmental Research (ILTER) sites.

The students, Silvia Mecenero of UCT, Saras Mundree of CSIR-Environmentek and Glynn Alard of SANParks, were highly impressed with the idea of the LTER network, and began to get excited about the idea of setting up a similar network for graduate students in South Africa. SAEON approved the concept of a student network, with a special website linked to the SAEON website to serve as the main platform for student interactions.

The scope of the website will be similar to that of the graduate student LTER website set up for the graduate students in the USA. The website will be updated regularly to keep students at the forefront of national SAEON and international LTER activities, including workshops, symposia and career opportunities.

The SAEON Graduate Student Network will

assist students to become more knowledgeable about SAEON and LTER programmes. It will promote interactions among graduate students and between students and senior scientists, within the realm of long-term environmental research.

It will provide a platform from where graduate students can feel comfortable to share ideas, collaborate with one another, and get a broader understanding of environmental research with an expanded context in which to view their own research. The network will encourage students to align their research with SAEON's long-term environmental programmes.

Planned activities include an international student symposium to educate students about SAEON, ELTOSA and ILTER programmes, share research results, and initiate collaborative research efforts, nationally and internationally. These will include research site presentations from national and international LTER graduates. Training workshops will build on skills that are essential to graduate students in their development as LTER scientists, such as information and data management, and collaborative or interdisciplinary research.

The South African network is currently being organised by an interim committee. Recently, Bernard Coetzee of the University of Pretoria was selected as a fourth member of this committee. Graduate students interested in participating, can contact one of the following members of the interim student committee:

**Dr Silvia Mecenero**, SAEON Post Doctoral Fellowship, Tel (021) 650-3648, E-mail [smecener@adu.uct.ac.za](mailto:smecener@adu.uct.ac.za)

**Ms Saras Mundree**, CSIR-Environmentek (KwaZulu-Natal), Tel (031) 242-2364, E-mail [smundree@csir.co.za](mailto:smundree@csir.co.za)

**Mr Glynn Alard**, Scientific Services, Skukuza, SANParks, Tel (013) 735-5487, E-mail [GlynnA@sanparks.org](mailto:GlynnA@sanparks.org)

**Mr Bernard Coetzee**, Honours student, Dept. Zoology and Entomology (UP), E-mail [bwtcoetzee@zoology.up.ac.za](mailto:bwtcoetzee@zoology.up.ac.za)



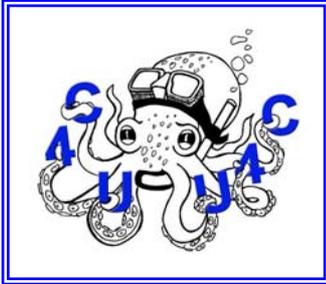
**REMEMBER 2006  
IS THE YEAR OF  
THE TURTLE**



# EDUCATION & OUTREACH

“C 4 U U 4 C”

*Karen Binning*



**National Marine Week 2005**  
Eastern Cape

The Department of Environmental Affairs and Tourism's National Marine Week this year ran from the 17 to 21 October 2005 with the theme "Protect our marine resources for the benefit of all".

The Marine & Coastal Educator's Network (MCEN), together with NGO's and private companies in the Eastern Cape has been working together since March this year to plan the events for National Marine Week.



The main focus was an Exhibition, set up by various organisations and companies at a venue in the Port Elizabeth Harbour. During the discussions, it was felt that along with the national theme, the Exhibition should focus on and highlight various careers linked to the marine environment as well as the importance of maths and numbers in the marine environment. In light of this, an Eastern Cape logo and theme were designed. The Eastern Cape theme for this year's Marine Week was "C 4 U, U 4 C" – the sea is for you and you are for the sea, and our logo is an octopus holding these letters. During Marine Week a competition was run for learners to name the octopus (logo). It was also decided the Exhi-

bition would be aimed at learners from grades 7 – 11.

The Exhibition was held at the NRE garages in the Port Elizabeth harbour and learners were taken on a tour from the pristine catchment area through to the rivers, estuaries, sandy beaches and rocky shores, island ecology and the deep oceans. The effect of exotic vegetation, pollution and ways that the estuaries and oceans are utilised were also highlighted. It was felt that it is important for learners to realise that what happens upstream in the freshwater reaches of a catchment, will have an effect on the oceans systems downstream.

The National Ports Authority, Port Elizabeth sponsored busses so that learners from disadvantaged areas could be transported to the Exhibition and other schools from as far afield as Alexandria were invited to visit the Exhibition. In conjunction with the Exhibition, a Workbook was also developed for both the educator and learner and linked to the Revised National Curriculum Statements (RNCS) in order to ensure that the visit to the Exhibition was not just an outing, but also a learning experience. All booked schools received the Workbook in advance and during their visit to the Exhibition were expected to complete various questions in the Workbook. The Workbook also had activities for learners to complete after visiting the Exhibition, allowing for further discussion once they were back at school.

Approximately 2000 learners visited the display during Marine Week, and by all accounts thoroughly enjoyed their visits and learning more about our oceans.

The "Name the octopus" competition run during the course of National Marine Week saw in excess of 600 entry forms being submitted. A short list was drawn up and the committee at a meeting on the 31 October 2005 voted on the new name for the octopus. The Eastern Cape Marine Week logo has now been officially named "Khathala" which means to care. The winner of the competition was Zolani Maqinga, a pupil from Douglas Mbopha High School, Port Elizabeth.



Other outreaches in the Eastern Cape were also planned. A team from the South African Institute for Aquatic Biodiversity (SAIAB) visited schools in the Libode Mega District focusing on issues such as fishing regulations and the use of marine resources. South African National Parks (SANParks) set up a Marine Week Exhibition in Boknes and transported learners and workers from the area to view the exhibition.

Special thanks must go to the main sponsors, the Department of Environmental Affairs and Tourism (DEAT) and the National Ports Authority (NPA), Port Elizabeth for their sponsorship and support of Marine Week Activities in the Eastern Cape.

African Coelacanth Ecosystem Programme  
South African Institute for Aquatic Biodiversity  
Grahamstown

**ENVIROKIDS AND I&J SUPPORT  
CAMP AFRICA FOR MARINE  
WEEK**

*Roberta Griffiths*



The Wildlife and Environment Society's (WESSA) junior environmental magazine, *EnviroKids*, focused on Our Changing Seas for Marine Week 2005. Magazines were mailed to WESSA's membership, libraries, schools, enviro-clubs, and over 600 Eco-Schools countrywide. Several thousand more



were sold via a bulk-order system to other environmental education organizations and centres around the country.



This year Irvin & Johnson kindly sponsored 300 *EnviroKids* magazines for under-privileged children. The magazines were distributed by

Camp Africa, a tented camp education facility at Soetwater near Kommetjie. Up to 60 children are accommodated in canvas tents and undertake a 3 to 4 day programme that aims



Grade 9 pupils from Prince Albert with their magazines.

to promote the sustainable use of the marine environment while giving children a hands-on outdoor experience. The programme teaches learners about the local fauna and conservation, as well as social problems such as drugs and HIV-Aids. The children explore the seashore and visit places like Cape Point, the penguins at Boulders Beach, Robben Island, and the Slangkop lighthouse.

For more information contact *EnviroKids* Editor, Roberta Griffiths, Tel. 021-671-8344 or Camp Africa, Tel. 084-680-1354.

### HANDS ON LEARNING ABOUT OCEANS WITH OLD FOUR LEGS *Karen Binning*

The Environmental Education and Public Awareness sub-programme of the African Coelacanth Ecosystem Programme (ACEP) aims to bridge the gap between science and the youth. Through various initiatives and outreaches it strives to capture the imagination of the youth and inspire them to value and conserve marine and coastal resources and to seek careers in science, engineering and technology.

It is understood that the more a learner is

involved in the learning process, the more they understand and remember. Based on this methodology ACEP have developed two sets of workshops, talks and an experiential learning opportunity on board the research vessel, the FRS Algoa.

#### Learner workshops and talks

Workshops involve smaller groups of learners and are developed to suit different age groups or educational levels; talks on the other hand are geared towards larger groups of learners (60 or more). Below is a brief summary of the workshops and talks.

##### Art Workshops (grades R – 7)

Learners in these workshops learn about coelacanths, their canyon habitats and their canyon friends through the medium of art. Depending on the age of the learners and time allowed for the workshop, the art workshops produce coelacanth and octopus puppets or coelacanth mosaics or canyons habitats filled with canyon creatures. In the process of making their art project, learners gain information about coelacanths, the deeper oceans and the importance they play in our everyday lives.

Many of the schools do not have access to paint, scissors and other materials used for these workshops and for many of the learners, this is the first time that they have had an opportunity to "play" with these materials. However, some of the learners are still incredibly creative and the art produced is of a very high standard.

The art workshops were piloted at Sasol Scifest in Grahamstown in March this year, and have since been presented nationally to 663 learners and 27 educators.

##### ROV Workshops (grades 7 -12)

Remote Operated Vehicles or ROV's are used to explore the ocean depths, and in April this year a ROV was used for the first time to explore the canyons and observe coelacanths of the Greater St Lucia Wetland



Park.

ACEP has developed 2 types of workshops based on the technology used for ocean research. In the first workshop learners use 2 litre bottles, propellers, elastic bands and other materials to build their own ROV. In the second workshop learners use plastic, craft knives and glues guns to build their ROV, and then use polystyrene, weights, principles of physics and a small swimming pool, to adjust the position and number of weights to ensure that the ROV glides through the water.

Many schools do not have the resources required to present workshops of this nature and meet their technology learning area outcomes. These workshops provide an opportunity for learners to gain valuable information whilst having fun and learning about science, and for educators to observe the learners using the tools and evaluate the finished product.

Whilst learners are involved in the workshop, ACEP will discuss the coelacanth, ocean exploration and the physics of the ocean that relate to the use of ROV's. ACEP also uses these workshops to discuss career opportunities in the marine environment.

The ROV workshops were also piloted at Sasol Scifest in Grahamstown in March this year and have been presented to 296 learners and 8 educators to date nationally

##### Interactive talks (all ages)

The interactive talks have been developed for use with larger groups of learners where "hands on" interaction is limited due to the numbers. The talks have again been developed around the coelacanth and its habitat and start out with an icebreaker, where learners make a sea creature from paper (origami), a discussion on the coelacanth and its habitat and then group work.

The interactions with learners through the workshops and talks have been popular with both the learners participating in the workshops/talks and with the educators, not only as enrichment, but also as an opportunity for assessment. Feedback from learners and educators has been positive.

#### Learners On Board

As part of Bioscience month, funded by the Department of Science and Technology and implemented by the South African Associa-



tion for Science and Technology Advancement (SAASTA), an essay competition was run in the Nelson Mandela Bay Municipality, Eastern Cape for Grade 11 learners who were doing Maths, Science and Biology. The learners had to write an essay of not more than 500 words on the topic "The importance of the ocean to me and my community".

Two winners were selected from all the entries received and their prize was an opportunity to spend time on board the research vessel, the FRS Algoa working alongside the scientists and the crew. In this way, the learners would be able to gain first hand experience about life at sea and working in research.

The winners of the competition were Kerryn Warren (St Dominics Priory High School) and Phumlani Mapolisa (Qaphelani Senior secondary School).



The learners boarded the FRS Algoa on the 14<sup>th</sup> September via a rubber duck transfer in somewhat rough conditions and got to spend two days at sea assisting the scientists collecting oceanographic data along the Eastern Cape coast. Both learners enjoyed the opportunity and gained valuable hands on experience with equipment and in laboratories.

The FRS Algoa docked in Port Elizabeth and other learners who entered the competition were invited to have lunch on board the ship and were also taken for a tour of the vessel.

The competition this year was run as a pilot and next year ACEP plans, funding dependent, to run this competition nationally.

Through these interactions with learners this year, ACEP has been able to excite and encourage learners to think more about the oceans and its importance to our lives. ACEP has also shared with these learners the vast number of careers that are linked to the marine environment in the hope that one day these learners will be our future scientists.

Contact Details for more information:

Environmental Education and Awareness  
African Coelacanth Ecosystem Programme  
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6140  
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**CAPE TOWN BLUE FLAG BEACHES HOST EXCITING MARINE WEEK PROGRAMME**  
*Michelle Preen*

The City of Cape Town, Sport and Recreation Department's enthusiastic beach managers, supervisors and staff, "Wondering Whale Watchers" from Jungle Theatre Company, energetic lifesavers from LifeSaving SA, volunteers from the National Sea Rescue Institute and nature conservation staff from the City of Cape Town were some of the people who contributed to an entertaining and informative National Marine Week programme. The programme was organised by the Environmental Planning Department of the City of Cape Town with amazing resources like tins of pilchards donated by Oceana Brands and marine-related posters, books, badges and t-shirts donated by the Department of Environmental Affairs and Tourism's Marine and Coastal Management Branch.

Beach managers from each of the City's Blue Flag and Pilot Blue Flag Beaches put to-



*Hands-on Environmental Education: Strandfontein Primary learners feel the texture of a jellyfish washed up on Strandfontein Beach*

gether a programme in collaboration with Environmental Planning Department staff, and local schools were invited to participate.

Mnanadi Beach and Clifton 4<sup>th</sup> Beach were recently re-awarded their Blue Flag status. Mnanadi Beach hosted learners from Wavecrest Primary and Clifton 4<sup>th</sup> Beach, in con-



*A mock rescue by the lifeguards at Mnanadi Beach*

junction with Camp's Bay Beach (a Pilot Blue Flag Beach), hosted Salt River Muslim Primary. Bikini Beach, which was awarded full Blue Flag status for the first time this year, hosted Temperance Town Primary. Strandfontein and Muizenberg (both Pilot Blue Flag Beaches) hosted Strandfontein Primary and Heathfield Primary, respectively.

The aim of the City of Cape Town's National



*Jungle Theatre Company "Whale Watchers"*

Marine Week programme was to create awareness about Blue Flag Beaches, coastal issues and beach safety, while enjoying a day at the beach! The various programmes covered the Blue Flag Campaign, the Eco-Schools and Adopt-a-Beach programmes, dune and sand movement, tides and weather, coastal birds, lifesaving and safety at the beach, and water quality issues.

Teachers and learners left the beach with resources and knowledge to take back and share with the rest of their school, families and communities, thereby contributing to the conservation and sustainability of our spectacular marine heritage.



# SANCOR COMMUNICATOR OF THE YEAR 2005

The Marine and Coastal Communicators of the Year Awards are hosted under the auspices of SANCOR and are awarded to individuals for outstanding contributions towards making the marine and coastal environment accessible to the public.

In 2006 SANCOR had the pleasure in honouring the 2005 winners for their outstanding achievements at an evening function at the Two Oceans Aquarium on the 11 January 2005.

The winners were as follows. In the **professional category**, a team of four people – Runette Louw, Margo Branch, Jenny Young and Pieter Badenhorst. Together this team has been responsible for the most amazing array of materials communicating and advertising the excitement of our marine world. The two most important programmes that this group has been responsible for have been the "Fact Sheets" and the development of "Interpretive and Informative Signage".



In the **volunteer category** the selection committee could not deny the fantastic contribution Mr Sibusiso Ngobese has made to marine science education. He has been teaching young children about tides, rocky shores, sandy beaches and what he has learnt from the ACEP on the deeper environment. Not only has he inspired the young, but educators in schools invite him to their classrooms to share information and his passion. S'Bu has a good knowledge of the environment and impart the facts, he believes in an interactive approach and skilfully will manage a group of 60 learners in the water, learning to snorkel.

S'Bu has also assisted in presenting and conducting his own educator workshops. He

has also assisted during the ship cruise with



education in the ports and undertook to show learners the ship and people who work on board. In the month of April 2005 he ran 9 rocky shore and snorkelling events, 4 educator workshops, 17 school presentations and 3 community presentations (2 radio and 1 to the tribal leaders [translation]). He saw 1252 children and 52 educators.

He is dedicated to teaching about the marine environment, he is passionate during his presentations and a model to the youth on achievement.

In the **scientific category**, the marine research community would like to congratulate Dr Phil Heemstra and his wife Elaine Heemstra. Dr Phil Heemstra has spent a life-long career dedicated to sharing his knowledge of fishes with fellow researchers and the wider public. His development of the innovative East Coast Fish Watch Project has inspired many people to learn more about fishes and how to identify them. His correspondence



and interaction with divers and underwater photographers has done much to elucidate the fish diversity of southern Africa and the western Indian Ocean.

One of the major achievements in the past five years for Dr and Mrs Heemstra has been

the publication of the book – Coastal Fishes of Southern Africa by Phil and Elaine Heemstra. This fantastic book not only helps with the identification of fish species but also provided invaluable information on fish biology and ecology. It is an information source that clearly bridges the gap between the scientific knowledge of fishes and the pragmatic and aesthetic appreciation of our wonderful fish diversity. Following on from this Dr and Mrs Heemstra are also currently working on a second book on the Coastal fishes of the Western Indian Ocean – this book involves some 49 collaborators and will be a worthy successor to the previously internationally acclaimed Smiths' Sea Fishes published in 1986.

These are just a few of the many achievements of Dr and Mrs Heemstra which has resulted in a career that has brought the world of coastal fishes to all who use and share the sea and its resources.

A **special award** was given to Mr John Kieser who has tirelessly worked in marine education, training and awareness for many years at the Department of Environmental Affairs and Tourism – MCM Branch. He has been responsible for extensive dissemination of invaluable material to coastal areas far and wide. He has also been responsible for phenomenal resource material and in keeping educators involved and informed through the Marine and Coastal Educators Network.



The SANCOR Steering Committee and the SANCOR community would like to once again congratulate all the winners – keep up the good work, our oceans and future generations need you.

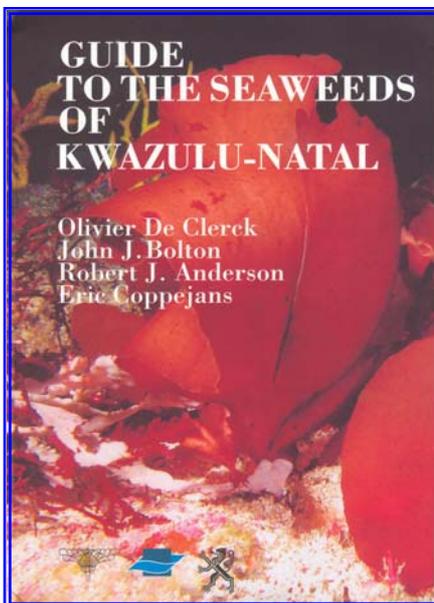


# BULLETIN BOARD

## BOOKS

### THE FIRST-EVER GUIDE TO KWAZULU-NATAL SEAWEEDS IS HERE!

Until now, identifying most of the seaweeds of KwaZulu-Natal was a task beyond anyone except a handful of seaweed taxonomists, because the descriptions of species were scattered through many papers from previous decades in many different journals.



The 294-page "Guide to the Seaweed of KwaZulu-Natal" illustrates and fully describes 212 of the more common seaweeds of KZN. It contains 278 excellent colour photos, as well as detailed scientific descriptions, making it invaluable for biologists as well as amateur naturalists and learners interested in the seaweeds of the east coast of Southern Africa.

Because the coast of KZN includes both warm-temperate (central and southern) and tropical (northern) elements, the guide includes many species found in the Eastern Cape as well as many others found in Mozambique and further northwards. For those interested in East African seaweeds, it

should be a useful companion to the recent "Marine Plants of Tanzania" (Oliveira, Österlund and Mtolera, 2005, published by the University of Stockholm). The KZN guide also includes a 25-page introduction with general information on working with seaweeds, a brief history of their study in KZN, and a general account of the coastal environment of the Province that will be useful to teachers and undergraduates. The guide covers the Chlorophyceae (green algae - 51 species), Phaeophyceae (brown algae - 31 spp.) and Rhodophyceae (130 spp.), with each of these sections authored by the relevant experts.

The guide is the culmination of collections and studies over more than 6 years by Eric Coppejans and Olivier DeClerck and their students from the University of Ghent (Belgium), and John Bolton (UCT) and Rob Anderson (MCM), and their students. Taxonomic sections are co-authored by recent doctoral graduates Tom Schils, Frederik Lellaert and Heroen Verbruggen (UGhent) and Enrico Tronchin (UCT). It is one of the final products of two 3-year projects funded by the Flemish Government (Bilateral Scientific and technical Cooperation Project 01/46), the National Research Foundation and the Dept. of Environmental Affairs, and assisted by Ezemvelo KZN Wildlife. The projects have also resulted in numerous scientific papers and student theses, and hugely improved our understanding of KZN seaweeds and their biogeography, adding more than a third to the species known to occur in KZN.

"Guide to the Seaweeds of KwaZulu-Natal" (Olivier DeClerck, John. J. Bolton, Robert Anderson and Eric Coppejans) is available at this stage only from the Bolus Herbarium, UCT. To obtain a copy, please send a cheque made out to The University of Cape Town. The cheque **must** be sent to The Bolus Herbarium, Botany Department, University of Cape Town, Private Bag, Rondebosch 7701, South Africa. Please make sure that you provide your postal address and a contact number.

### Price

Collected from the Bolus Herb: R280  
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## CONFERENCES

### "FROM SOURCE TO SEA"

Southern African Society of Aquatic Scientists and the Phycological Society of Southern Africa are hosting a joint conference.

DATE: 19 to 23 June 2006

PLACE: Maputo, Mozambique

Enquiries: Organizational aspects

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