

Edited by: R. van der Elst & A. Moor

Contributions by: J. Brash, L. Celliers, B. Everett, A. Kruger, B. Mann, M. Schleyer, E. Steyn & R. van der Elst

Issue 44 - May 2006

uShaka Marine World, Durban

PO Box 10712, Marine Parade, 4056

www.ori.org.za

TAGGING RESULTS HIGHLIGHT CONSERVATION SUCCESS

In 2001, ORI initiated a shore-angling fish monitoring and tagging project in the St Lucia Marine Reserve north of Cape Vidal¹. The main objective is to evaluate MPA impact on linefish and thus to assist in long-term MPA management.

Using a selected team of trained anglers and staff from Ezemvelo KwaZulu-Natal Wildlife, regular mark and recapture surveys are conducted. Preliminary results of this project are showing a remarkable doubling in catch per unit effort (CPUE) in the previously exploited area between Cape Vidal and Leven Point (Fig 1). This is mainly attributed to the exclusion of shore anglers from this area since the promulgation of the beach vehicle ban in January 2002. By way of comparison, the CPUE in the sanctuary area north of Leven Point has remained relatively consistent, although strong seasonal fluctuations are evident.

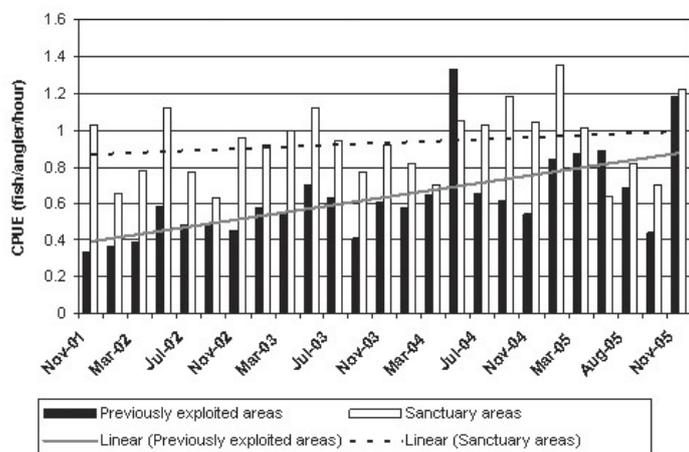


Fig 1. Bimonthly trends in CPUE in the St Lucia Marine Reserve

One of the most common angling species caught in the area is the speckled snapper *Lutjanus rivulatus* (Fig 2). To date, 546 snapper have been tagged and an incredible 132 (24%) have been recaptured – including multiple recaptures of the same fish. The majority of recaptures (78%) have been made within 200 m of the original point of release and only 22 fish have moved more than 200m (Fig 3). Clearly, this species is highly resident with a relatively small home range. Interestingly, during the past two field trips, four speckled snappers have been recaptured more than 10km from where they were originally tagged suggesting that there is a component of the population more predisposed to a nomadic lifestyle.

This project is providing extremely useful information on the value of marine protected areas as a tool for managing fish populations. It is also having the added benefit of increasing awareness and support amongst anglers to the value of marine protected areas.



Fig 2. Speckled snapper

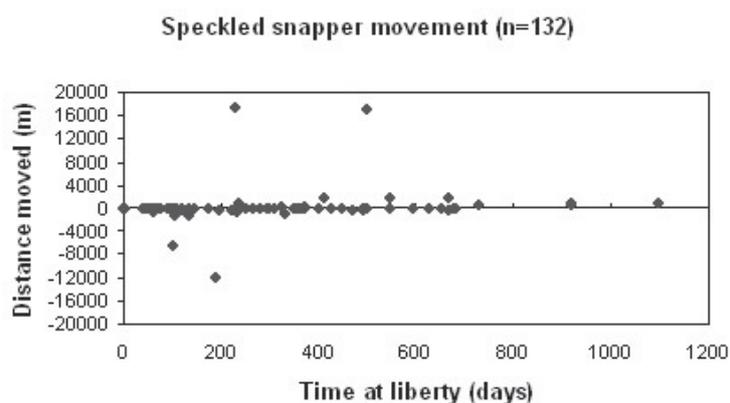


Fig 3. Movement of tagged speckled snapper tagged in the St Lucia Marine Reserve to end 2005 (negative numbers reflect southward movement). One fish that moved 63 km northwards to Lala Neck is not shown.

¹Funding is provided by Marine and Coastal Management and Ezemvelo KwaZulu-Natal Wildlife provide logistical support.

TRANSKEI LOBSTERS

Fisheries management is never easy, especially when it involves high market value resources like abalone, sea cucumbers, shark fin and lobsters. One such resource is the East Coast rock lobster *Panulirus homarus rubellus*, which is most abundant in shallow water off KwaZulu-Natal and decreases progressively southward in the Transkei region.

In KwaZulu-Natal, access to this fishery has historically been confined to non-commercial use by individuals but in the Transkei region coastal people earn a livelihood by selling this species to tourists and coastal hotels. Considering its high value it is not surprising that there is growing interest in commercialising this fishery and developing the artisanal sector into a small-scale commercial fishery, with larger companies keen to secure export rights.

In order to assist Marine and Coastal Management (MCM) formulate a sustainable approach, ORI investigated the Transkei fishery from 2002 to 2005. This involved regular field and questionnaire surveys at fishing sites, resorts, back-packer camps and private cottages to quantify the artisanal off-take, calculate biological reference points and establish socio-economic parameters about the fishery and its techniques.

More than 6,400 lobsters were processed and biological data collected for per-recruit modelling. Models indicated that the artisanal fishery was already operating at optimal levels and extra effort would place the resource at risk. Thus, new fisheries would need to involve re-allocation from the artisanal sector.

Several significant management challenges were identified. Compliance in the remote and understaffed Transkei region proved a priority concern. Results confirmed that 60 - 85% of catches were below the legal size of 65mm carapace length, a problem further exacerbated by the ready market for under-sized animals by cottage residents and back-packers. Conversely, the models revealed that the fishery could be improved by reducing this under-sized harvest. Coffee Bay and Presley Bay were specifically identified as sites where over-fishing of undersized lobsters occurred.

All information pointed to Transkei and KwaZulu-Natal lobsters being of one stock and hence a single management unit. Thus, over-exploitation in one region could risk the fishery in the other. Furthermore, different management strategies and cross-border movement of lobsters

can promote illegal markets. Hence methods that distinguish between legally bought lobster from Transkei and lobsters caught recreationally in KZN should be sought. Although considerable data was collected, the variance on the models remained high and thus data on growth, mortality and fecundity need to be supplemented to ensure responsible management and minimise risk.

While government may be under pressure from commercial interests, it will have to consider all the data and management options before it as part of its responsibility to sustainable fishery development. Aside from the biological risk to the lobster stock, the fishery in KwaZulu-Natal as well as the existing artisanal users in Transkei need to be considered. Any new initiative would have to ensure that spawner biomass- and egg production-per-recruit does not fall below 30% of unexploited levels. A detailed management system would need to be in place to ensure proper allocation of access, limitations on effort and monitoring of catch, as well as innovative ways of recording commercial transactions. Most important would be control over gear. The fact that boats, traps and artificial breathing apparatus are not currently permitted has contributed to the relative health of the lobster stocks by retaining a deeper-water reserve that replenishes the shallower exploited reefs. Such built-in safety measures should be retained.



Local lobster fishermen waiting for their lobsters to be measured and weighed at a commercial buying station in Mdumbi.

NEW FUNDER FOR TAGGING PROJECT



**The Tony and Lisette Lewis
Foundation South Africa**

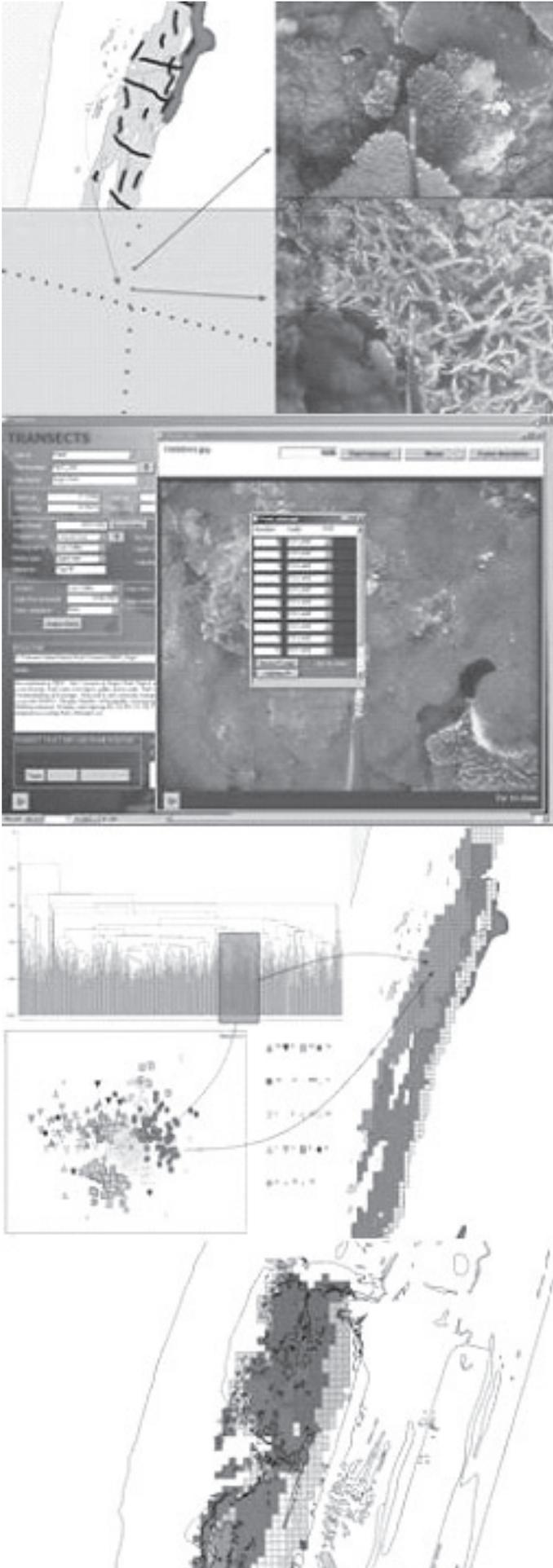
ORI and WWF (SA) are delighted to confirm that funding has been secured for ORI's long-term tagging project.

The Tony and Lisette Lewis Foundation (TLLF) will fund the project for the next three years. Established by the late Tony Lewis and his wife Lisette, the TLLF is a non-profit charitable organisation devoted to the well-being of wildlife and the conservation of its habitat.

Tony Lewis was born and educated in Sydney, and with Lisette lived for many years in South Africa. They owned a game reserve adjoining Kruger Park and were closely involved in wildlife conservation.

Through the generous legacy of the Lewis family, the TLLF is able to make substantial and ongoing contributions to the country's conservation programmes.

SUPPORTING WISE TOURISM DEVELOPMENT



A representation of data collections, extraction, analysis and final product.

Environmentally-based tourism is a significant driver of economic development and a potential panacea to poverty relief. But paradoxically, tourism can also impact negatively with long term environmental and socio-economic consequences. How do tourism developers avoid this pitfall and how best can they take advantage of the latest information available to ensure viable and sustainable development? The answer may lie in the application of a multi-sector decision-support model, similar to that recently developed for the Greater St. Lucia Wetland Park (GSLWP).

This multi-institutional and multi-disciplinary project² brought together a wide range of expert data and opinion in an integrated and GIS-based expert system. For example, it involved highly specialised 3-D seafloor maps to reveal the distribution of different habitats, such as coral reefs, on the continental shelf between Leven Point and Kosi Bay. Superimposed were biological data that visually portray the complexities of these fragile ecosystems, identifying zones potentially sensitivity to disturbance, including fishing and diving. Much of the information was derived from thousands of archived photographic transects of these reefs, interpreted and analysed through multivariate numerical methods. In addition, a further 19 dedicated field surveys were undertaken by ORI to record a further ~10 500 images or 4.2GB of data.

The expert interpretation of multivariate analysis has identified 15 ecologically distinct zones, each characterised by a unique combination and abundance of biota with different sensitivities to human impacts. Combined with the geophysical data, this now presents tourism entrepreneurs and conservation agencies with a dependable and accurate tool to plan management and development of these vulnerable ecosystems. Specifically, the model can extract spatially referenced information that can be interrogated to identify locations that are suitable for certain tourism activities, assist with the setting of carrying capacity levels and provides developer with the finest bio-physical data necessary to make their venture a success.

While the model was developed with data pertaining to the GSLWP, it can be applied to a range of other application providing the basic information can be collected.

²Developed as part of the Innovation Fund initiative by the Department of Science and Technology and involving Marine Geosolutions, the Council for Geoscience, Graham Muller Associates, Ezemvelo KwaZulu-Natal Wildlife and the Oceanographic Research Institute.

WIOFISH DATABASE GOES LIVE!

The ORI, in collaboration with marine research institutes from Mozambique, Kenya, Seychelles and Tanzania, have populated a MS Access database with descriptions of 163 small-scale fisheries of the western Indian Ocean.

In order to make this information more widely available to resource managers and the general public, we contracted The Blue Box to convert the database to an online reporting system that, as of 1 May 2006, is freely available on the Internet at www.wiofish.org.

This is the first phase of the online development and the system will now be further enhanced to allow live updating of existing data and the addition of new data to the database by researchers anywhere in the region.

ALIWAL SHOAL: A PAPER PARK OR REAL PROGRESS?

Unfortunately, the coastline of KwaZulu-Natal is relatively straight and thus devoid of interesting bays and islands. But below the water there are several outstanding features, largely comprising dunes that solidified into rock before sea level fluctuations over the millennia turned them into submerged reefs.

Finest of these is the Aliwal Shoal, just south of Durban in 6-30m deep. Aliwal is a biodiversity "hotspot", a site of great fish abundance and also hugely popular with scuba divers as a world famous location where ragged-tooth sharks aggregate. However, Aliwal is less popular with shipping merchants as a hazard, evident from its most recent victim the Produce, which sank there in 1974.

Clearly these diverse attributes can result in user conflict – and it was exactly this that led to a Ministerial request for action to protect this valuable reef complex. At ORI's instigation, a workshop was convened in 1995 to discuss usage and protection of the shoal by all interested and affected parties: divers, spearfishers, anglers, tourism operators, scientists, conservationists, developers and others with a passion for marine life. As a result, the Aliwal Shoal Forum was established to formulate a management plan for the Shoal. Chaired by ORI, this Forum was to ensure wise and sustainable use the Shoal's resources, alleviate user conflict and accommodate the aspirations and needs of local communities.

Within one year a preliminary Management Plan for the Shoal had been completed and submitted to government. That was in 1999, but it took six years for Aliwal Shoal to be formally declared a Marine Protected Area (MPA) by the Department of Environmental Affairs and Tourism³. On paper the new rules are adequate for protecting biodiversity on Aliwal and for regulating the various activities. But they now urgently need practical implementation. ORI continues to support and undertake research on Aliwal. A preliminary survey of reef organisms revealed significant variations in distribution. Noticeable was the exceptional abundance of encrusting sponges in the north, a pattern that suggested a possible relationship with the wood pulp discharge from the nearby Sappi-Saiccor marine outfall.

Further investigation using stable isotope techniques confirmed this assessment and this will hopefully further improve the management and assimilative capacity of pulp mill effluent. Geophysical surveys on the bathymetry and geology are being completed by the Marine Geoscience Unit at the University of KwaZulu-Natal. Simultaneously, a more detailed biodiversity survey was completed by Jennifer Brash, an MSc project at ORI.

Our research initiatives are thus running ahead of the proposed conservation and management plans for Aliwal Shoal and we will be in a strong position to provide advice to the conservation authority when the MPA truly "gets off the ground".

³ 2004, Government Gazette No. 26433

ORI TO HOST MAJOR REGIONAL MARINE SCIENCE SYMPOSIUM

It is with considerable pride that ORI can announce having been awarded the right to host the next West Indian Ocean Marine Science Association (WIOMSA) symposium in October 2007.

WIOMSA is an association that fosters collaboration between coastal and marine scientist of the region. ORI has for years played a supportive role to WIOMSA and it is thus appropriate that we should contribute to its continued success. The symposium will focus on the integrated roles of science, policy and management in meeting the changes and challenges facing the East African and WIO region. Some 300 researchers and students from 15

countries in the region will participate. The symposium is also a fine opportunity to showcase Durban's support for coastal and marine development and conservation.



RECENT PUBLICATIONS⁴

DE BRUYN, P., DUDLEY, S.F.J., CLIFF, G. & SMALE, M.J. 2005. Sharks caught in the protective gill nets off KwaZulu-Natal, South Africa. 11. The scalloped hammerhead shark *Sphyrna lewini* (Griffith and Smith). African Journal of Marine Science 27 (3): 517-528.

COSTA, A., PEREIRA, M.A.M., MOTTA, H. & SCHLEYER, M.H. 2005. Status of coral reefs in Mozambique: 2004. In: Souter, D. & Linden, O. eds. Coral reef degradation in the Indian Ocean: status report 2005. Coral Reef Degradation in the Indian Ocean, Kalmar, Sweden: 54-60.

MANN, B.Q., HAND, R. & TYLDESLEY, M. 2005. Do inshore reef fish species benefit from protection within the Greater St. Lucia Wetland Park (GSLWP)? A novel approach to monitoring and evaluating the effectiveness of marine protected areas in South Africa. 1st International Marine Protected Areas Congress (IMPAC), Geelong, Australia.

PEREIRA, M.A.M. & SCHLEYER, M.H. 2005. A diver and diving survey in Southern Mozambique. In: Souter, D. & Linden, O. eds. Coral reef degradation in the Indian Ocean: status report 2005. Coral Reef Degradation in the Indian Ocean, Kalmar, Sweden: 184-192.

SCHLEYER, M.H. & CELLIERS, L., KRUGER, A., MACDONALD, A. & GLASSOM, D. 2005. Coral reef research in Northern KwaZulu-Natal, South Africa. In: Souter, D. & Linden, O. eds. Coral reef degradation in the Indian Ocean: status report 2005. Coral Reef Degradation in the Indian Ocean, Kalmar, Sweden: 61-65.

SOUTH AFRICAN ASSOCIATION FOR MARINE BIOLOGICAL RESEARCH. 2005. SAAMBR Bulletin 29: April 2002 – March 2003 and SAAMBR Bulletin 30: April 2003 – March 2004: 36p. (van der Elst, R.P., Everett, B.I. & Moor, A.S. eds.)

⁴ Contact: librarian@ori.org.za