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SWIOFP COMMENCES RESEARCH CRUISES IN THE WESTERN INDIAN OCEAN WITH THE *RV NANSEN*

The South West Indian Ocean Fisheries Project (SWIOFP) has just completed its first research survey which was conducted off the coasts of Mozambique, Madagascar and Comoros from August to November 2009.

Several ORI scientists participated in the survey, which used the Norwegian Research Vessel (R/V) *Dr Fridtjof Nansen*. The "Nansen" is well-known along the west and east coasts of Africa, where it has spent many years supporting marine research, and providing scientists and students from African countries with opportunities to become familiar with the workings of a modern research vessel and with the marine resources in their domestic waters.



Dr Fridtjof Nansen lies off Majenga in western Madagascar

For many of these scientists, time spent on the Nansen represents a 'coming of age' experience, when sampling theory becomes practice, in fair weather or rough seas, during the frenetic activity when a large catch is hauled on board, or during the more routine activities of ship-board life.

The 2009 surveys were scheduled to perform fisheries sampling for SWIOFP and at the same time conduct environmental sampling transects for the Agulhas and Somali Current Large Marine Ecosystems Project (ASCLME). A total of 15 local scientists were accommodated on board the ship, including ORI scientists Johan Groeneveld, Sean Fennessy, Fiona MacKay and Jessica Escobar. In addition, four experienced Norwegian scientists were on board – their task was to lead the 15 novices through the maze of sampling gear and ship-board activities, and familiarize them with the vessel's data acquisition systems.

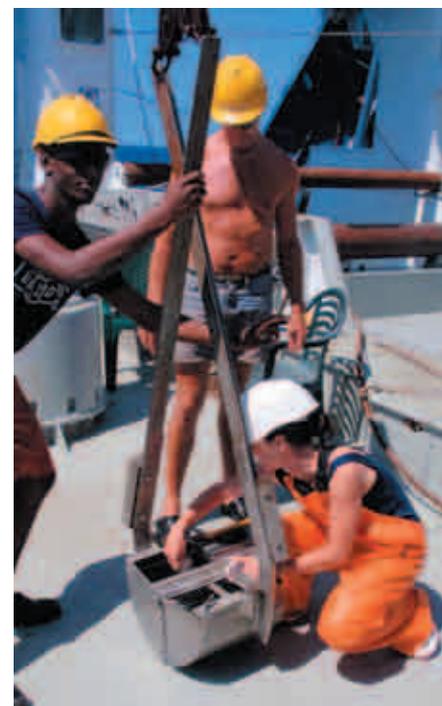
The latter ranged from a relatively simple programme for

the capture and analysis of biological information, to sophisticated multibeam echo-sounders used to map the seafloor and locate fish aggregations. With hindsight, our Norwegian colleagues must have been of a very patient disposition, to be able to cope with all the different projects, personalities, cultures and languages on board – at any one time, a combination of Norwegian, English, French, Portuguese or Malagasy could be heard on the main deck or in the mess!

The objectives of SWIOFP during the surveys were to do an acoustic survey for small pelagic fishes, together with midwater trawls to determine the species composition of any schools that were located. Bottom trawls for demersal fishes and crustaceans (mostly prawns) were done where the seabottom was not too rough or steep.

Biological sampling was done of all catches, to determine the species composition, numbers and weight by species, and the size- and sex composition of priority species for fisheries assessment purposes. Benthic grab samples of the seabed were done along transects to compare bottom condition between fished and unfished areas.

A marine mammal observer spent many hours of each day on deck to identify and count whales and dolphins. This resulted in one of the highlights of the survey, when more than 100 hump-back whales were observed around the ship in a single day in late August, off southern Madagascar. On this day small whale pods lazily drifted by in a glassy smooth sea, interspersed with towering breaches by frisky males, often in tandem or strangely synchronized.



Researchers inspect the contents of a grab sample

Continued on Page 3

JUNGLE DRUMS AND THE IUCN RED LIST

Depending on who you are, a drum could be a musical instrument, but also a fish from the family Sciaenidae which produces rhythmic sounds by vibrating special drumming muscles against its swim bladder.

These fishes are also known as croakers (for the same reason), but in South Africa they are simply known as kobs or kabeljou, derived from the name given to them by the early Dutch settlers. The family is the seventh largest among the 150 families of Perciformes (perch-like fish), and includes about 80 genera and almost 300 species. Of these, 25 species live exclusively in freshwater. Many of them use estuaries as nurseries or as seasonal feeding grounds for adults. Others are year-round inhabitants of estuaries and coastal lagoons – very few are reef-associated.

Sciaenids often represent a major component of near-shore artisanal and commercial trawl catches – either being targeted or as bycatch. Many are valuable food fishes that are sold fresh or salted and sun-dried. Their gas bladders are a high value delicacy and are also used for medicinal purposes in Asia. Most species are vulnerable to over-fishing and habitat degradation caused by coastal development worldwide.

The IUCN Species Survival Commission identified this family as a conservation priority and established a Sciaenidae Red List Authority (RLA) to assess the risk of extinction of all sciaenids, and to recommend actions needed in the next decade to ensure their survival.



Freshwater sciaenids in the Manaus fish market

To accelerate the process, a workshop was recently held in Manaus, Brazil, at which experts undertook Red List assessments for this group of fishes. The focus on this family forms part of a wider collaborative programme between IUCN and Conservation International, called the Global Marine Species Assessment (GMSA), which aims to assess approximately 20,000 marine species by the year 2012. The purpose of the GMSA is to facilitate species conservation plans, to provide the information necessary for a global marine Hotspot analysis, to identify Key Biodiversity Areas, as well as to feed into MPA establishment, policy and law.

The workshop participants were invited by Professor Labbish Chao, a sciaenid taxonomist at the Federal

University of Amazonas, Manaus, who was appointed Focal Point of the Sciaenidae RLA by the IUCN Species Survival Commission. Apart from being Professor Chao's home base, Manaus is on the confluence of the Negro and Solimões rivers at the start of the Amazon River proper, and the busy fish market there processes large numbers of freshwater sciaenids.



IUCN sciaenid workshop participants in mid-assessment

ORI's Dr Sean Fennessy was approached to provide input at the workshop because of his work on several Indo-Pacific sciaenids, and he joined scientists, taxonomists and biologists from countries such as Ghana, United Arab Emirates, India, Australia, Vietnam, Thailand, China, Mexico, Venezuela and Brazil.

Prior to the workshop, information on distribution, population, habitat and ecology, threats and conservation measures had to be time-consumingly reviewed for the species allocated to each participant, and this was entered into IUCN's Species Information Service (SIS) database.

At the workshop, the aggregated information for each species was discussed and a Red List category for that species was decided on by consensus.

An important point to note is that these are global assessments of extinction risk so, even if a species is locally threatened, this may not be the case at the global level. This quickly became apparent for species for which there were considerable amounts of information for some countries, but were lacking for others. Difficulties were also encountered for some species as some, particularly from the speciose genus *Johnius*, are notoriously difficult to tell apart, and catch records often include aggregates of several species.

How are South African sciaenids doing? Based on local stock assessments conducted several years ago, some of the larger species such as dusky kob, silver kob, squaretail kob and geelbek are likely to eventually be put on the threatened list, while smaller species, such as snapper kob and mini-kobs, tended to be at the level of "Least Concern". However, the assessments still have to undergo a rigorous review process which will take some time to complete.

Undoubtedly there is a need for re-assessment of the stock status of local sciaenids which were classified as over-exploited in the 1990s, particularly since several management measures have been introduced in recent years to address this.

TRACKING THE KWAZULU-NATAL LINEFISHERY

Linefishing is one of the most important fisheries in South Africa in terms of number of participants, variety of users and diversity of species caught.

Nowhere is this more so than along the coast of KwaZulu-Natal, where it contributes to food security, tourism development and livelihoods. But linefishing involves numerous endemic species, many badly depleted. It was therefore decided years ago to undertake periodic global assessments of the KZN linefishery to detect any trends that might require management intervention in response to changing environmental conditions and socio-economic issues.

The overall aim of such research surveys is to assess the management effectiveness of the KZN linefishery in each of its main sectors: the shore fishery, recreational and commercial skiboat fishing, spearfishing and estuarine fishing.

It has taken twelve long years since the last assessment to revisit this earlier commitment to assess the linefishery. With funds finally granted, a suitable student was "reeled in" to conduct the second survey. Now already eleven months on, MSc student Stuart Dunlop is well on his way to tracking changes in the fishery

With the summer fish already 'shoaling' along the KZN coast, field work began almost immediately in early February 2009. Stratified-random creel survey techniques were used for the shore fishers while the boat-based fishery has been assessed by means of random access-point surveys.

Fishers in both sectors were interviewed with a detailed questionnaire that provides valuable information on fisher trends, demographics and attitudes to management. These features form an increasingly important part of fishery management and can be compared to a similar approach used in the first surveys conducted more than a decade ago. These data will provide a comprehensive assessment of changes in the KZN fishery and the levels of participation in all of its sectors.

To date a total of 325 shore patrols and 160 access point surveys have been conducted during which 4,308 shore anglers have been checked and some 892 detailed questionnaires completed. For the boat sector, 111 boats from 32 launch sites have been checked and an additional 89 questionnaires completed.

The questionnaire for shore anglers remains a challenge as many anglers in the hype of 'fishing fever' are reluctant to be probed by a 'strandloper' scientist, as Stuart has been named by other ORI staff. Nonetheless, with a little tact, those who have been interviewed have parted with much valuable information, including the very bizarre. For example, one respondent claimed that there has been a decline in fishing attributable to the 2007 tsunami. Others blamed jelly fish and dolphins for a drop in fishing success.

Most fishers (83%) do perceive a marked decline in the linefishery with fewer fish and of smaller size being taken. This is an early worrying fact and verification of these perceptions will be undertaken.

After one year of data collection, analysis of the data collected will begin in earnest. Once analysis of the shore and offshore boat fishery survey data is complete, comparison with other available long-term data sets will take place.

Based on the results of the above activities, the measurable activity will be to make recommendations towards improving management of the KZN Linefishery and the publication of the results in peer-reviewed journals. Sustainable development of coastal and marine resources is pivotal in strengthening environmental services and socio-economic opportunities for the people of KZN.



SWIOFP RESEARCH CRUISE IN THE WESTERN INDIAN OCEAN

Continued from Page 1

Sampling for the ASCLME project was undertaken along transects perpendicular to the coast, and a CTD unit with water samplers was lowered to depths of up to 2000m. At each station along the transect, which stretched from near the coast to a distance offshore where depth exceeded 2000m, environmental samples (temperature, salinity, chlorophyll a, dissolved oxygen, stable isotopes etc) were collected with the CTD unit, and a multinet was deployed to collect phyto- and zooplankton samples at several depths.

Although much of the scientific data still needs to be processed and analysed, some early results have emerged. The bottom trawl catches showed a high diversity of tropical fish and crustacean species but, in general, the catches brought on board were small, suggesting that numbers per species, and thus biomass, was low. This was also the case for small pelagic fishes, where fish schools were

conspicuously absent from echo-soundings throughout the 82 survey days. One possible explanation for the virtual absence of sardines, scads, and small mackerels may be that they have a seasonal distribution pattern, and may have been concentrated inshore of the 20m depth isobar during late winter/spring, when the Nansen surveyed the region. Its large size prevents the Nansen from sampling shallower than 20m depth – an obvious drawback of the recent surveys.

Whether it was because of the excellent food on board, the late afternoon sessions in the gym, the warm tropical sunny days at sea, the hustle and bustle of a trawl coming up with fish of all shapes and sizes or maybe even the camaraderie that developed among the ship's company during long days at sea, when the time came for ORI staff to leave the ship, it was with the firm conviction that they would be back!

WIOMSA SYMPOSIUM GENERATES EXCELLENCE IN MARINE SCIENCE

The West Indian Ocean Marine Science Association (WIOMSA) held its 6th scientific symposium at the University of Réunion in August 2009. The Symposium theme was highly relevant - The Millennium Challenge: How marine science and management meet development goals”.

With more than 400 delegates, this symposium was even bigger than the 5th Symposium hosted by ORI two years earlier. By all accounts it was a great success and ORI scientists made their mark by being involved in no less than 14 presentations.

Although the topics were wide ranging, the key themes of climate change, sustainability of resources, vulnerable species and social dimensions of resource use were highlighted. ORI's presentations dealt with long-term

community change in coral reefs and some of the associated ecological functions.

The WIOFish database formed the basis of a paper that suggests there have been positive trends towards achieving fisheries Millennium Development Goals (MDG), especially in the higher proportion of WIO fisheries that are now under some form of scientifically-based management regime.

It was clear that the level of science presented was of the highest standard and reflected well on the scientific capacity in the region. Perhaps the only regret was the generally poor attendance by management and political leaders who ultimately are responsible for implementation.

The Symposium ended with the AGM of WIOMSA, at which ORI's director was elected to the Board of Trustees.

ORI STUDENT WINS AWARD

The South African Agency for Science and Technology Advancement (SAASTA) hosts an annual competition - the Southern African Science Lens Photography Competition - to communicate science in new and innovative ways.

ORI PhD student, Camilla Floros, was the winner of the Science Close-Up category, as well as the overall winner of the competition, which included 300 entries from all over South Africa.

The judges said Camilla's photograph of a coral polyp (*Fungia* spp) was an instant winner. "The colour is fantastic and detail so perfect that you want to reach out and touch the image". The "ethereal" photograph had the judges "oohing and aahing" almost instantly.

The picture was taken in the Research Aquarium at ORI and Camilla's aim was to show that although corals are tiny animals, they are very important because they are the basic building blocks for huge ecosystems like the Great Barrier Reef. Coral reefs are threatened globally from a variety of human-related activities. The purpose of growing corals in research aquaria is to reduce the pressure of collecting colonies from the wild and disturbing coral reefs.

Camilla is due to complete her PhD entitled "Indicators of condition on the marginal, high-latitude reefs of KwaZulu-Natl, South Africa" in early 2010. She won a cash prize, as well as a Canon DSLR camera for her winning photograph (right).

MORE TAGGING RESULTS

There is a frequent buzz in the tea room at ORI when Tagging Officer, Elinor Bullen, reports an exciting fish tag recapture.

For example, a yellowfin tuna, originally tagged at Cape Point off the Western Cape, was recaptured in Mozambique near Inhambane, 2701 km away in 252 days, thereby helping to confirm an Indian Ocean connection with the yellowfin off Cape Point.

Equally striking was the capture of two large tagged shad *P. saltatrix* at the same time and in the same place north of Richards Bay. Clearly, both fish had been in the same shoal, and both had been tagged more than 1000 km to the south – but one had been at large for 18 months while the other had escaped recapture for almost 2½ years, suggesting a mixing of shoals.



The mouth of a coral polyp surrounded by tentacles

SOME RECENT PUBLICATIONS INVOLVING ORI STAFF

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