

Phycological Society of Southern Africa



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From the Editor

Welcome to another edition of the PSSA newsletter. Like the many before, this edition is also filled with exciting information from within and beyond the Society. In this edition of the newsletter, a number of our members have provided feedback on their recent travels and in particular, some of the more recent conferences that they had attended. Our outgoing president and the chairperson of the GEOHAB programme, Grant Pitcher, makes an appeal to all those interested in participating in the GEOHAB Core Research Project. Also included are two exciting articles: a featured article on the recently established *Southern African Sustainable Seafood Initiative* that seeks to reduce pressure on our vulnerable linefish; and a student article by Andrew Rand on the GIS mapping of South Africa's kelp beds. There certainly is lots of variety in this issue and I am confident that this edition of the newsletter will be well worth reading.

A special thank you to all those who have contributed to this edition of the newsletter. Your efforts are most appreciated. There are many colourful images in this issue. All featured and student articles appear on the website, so the colour versions of the images will be available. Please remember to send any and all information you think may be of interest to the society on to your regional collators (details below).

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Southern Areas

Enrico Tronchin

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Sincerely

Gavin

Synarthrophyton patena
epiphytic on *Gelidium capense*



News and Reviews

1. Where money meets science

Earlier this year I was privileged to complete a two-month research internship at the Center for Marine Science (CMS) at the University of North Carolina, Wilmington (UNCW), in Southern USA. I had previously conducted molecular systematic research at CMS during a short stay in 2001, as part of my PhD. Wilmington is a small town on the east coast, on the banks of the Cape Fear River. It is the birthplace of Michael Jordan, and if you haven't seen him play basketball, you've probably brushed your teeth or mowed the lawn with products he endorses. It is also the filming location of Dawson's Creek. Now there's a point of reference. In Wilmington, fast food outlets and churches outnumber the papillae on *Sarcothalia radula* gametophytes. Here, a fast food chain called Café Hardee aims to uplift social fabric with billboards that decree: "Life is short, eat thick", aiming to promote their new... well you guessed it, 'Thickburgers'.

The people are friendlier than life insurance brokers and the suburbs are safer than houses. In some ways it is your stereotypical fun-loving seaside town, and with respect to CMS, what a great place for anything marine! In fact, CMS has an invasive *Gracilaria* hugging the pylons of its peer, and a nasty looking diverse algal mat that's suffocating the numerous tanks in the experimental mariculture setup, killing anything remotely resembling a commercially valuable animal. Otherwise, CMS is abuzz with scientists and students at the forefront of their fields, deriving inspiration from their work and their peers, the marine ecosystem and their interaction with it, as well as the stunning first-class facilities that CMS offers.

The bastions of phycology at CMS are Dr. Wilson Freshwater (my collaborator), who is researching the population genetics of an endangered seagrass species, the phylogeography of the invasive *Gracilaria vermiculophylla*, the systematics of *Polysiphonia* and other Ceramiales, Lion fish phylogeography, the phylogeny of the Gelidiales, and the evolution of the essential toadfish. Dr.



The Center for Marine Science (CMS) at the University of North Carolina, Wilmington (UNCW), Southern USA.

Craig Bailey specializes in the evolution, molecular biology and population dynamics of marine and freshwater phytoplankton, and just can't get enough of work. He is investigating the origin and evolution of 18S rRNA introns of some chromophytes, characterising nuclear or organellar genes in dinoflagellates and other protists, researching the systematics and ecology of coralline algae, and editing three scientific journals, just for good measure. Dr. Fritz Kapraun periodically slaughters chickens for their blood to use as a standard in a fluorescence spectrophotometry methodology for quantifying DNA in numerous red, green and brown algae. Be sure to catch his plenary at this year's IPC8 if you are interested in the DNA-localizing flouochrome DAPI technique. I know I am! He is a fun guy, bringing a lifetimes worth of dedication and love for phycology to every meeting with students and inspiring them. He's the guy who coined the phrase: "The seaweed industry is much like the condom industry, there's a lot of money involved but you never hear about it". I guess that's true. I haven't heard any of my friends brag about their shares in Durex. Then there is Dr. Andrea Bourdelais (Post-Doc Research Scientist), a true credit to CMS for the work she is conducting on the dinoflagellate *Karenia brevis*. Her work is aimed at developing a new drug for the treatment of cystic fibrosis. The active compound is called brevenal. This is *K. brevis*'s natural antidote to brevetoxin, the nasty neurotoxin it produces that results in massive fish kills and public disturbances every year. Everyone at CMS is excited about her,

including the media. Her research has gained considerable impetus due to her numerous interdisciplinary collaborations. It is not uncommon to find six or more co-authors on her publications from as far a field as neurotoxicology and atmospheric science. Dr. Bourdelais is part of the HABLAB (Harmful Algal Bloom Laboratories for Analytical Biotechnology), coordinated by Dr. Daniel Baden (Director of CMS), which reportedly secures \$1.5 million in research funding annually. Finally, let me not forget Dr. Carmelo Thomas, a prominent harmful algal bloom taxonomist and ecologist who is a major contributor to the HABLAB.

The biggest benefit to having spent time at CMS was on having had the opportunity to fatten up on Café Hardee biscuits and Java City mocha grandes. Just kidding. I benefited tremendously from the exposure to the level of interaction between students and supervisors, across disciplines. The benefit of reading outside of my field has also never been more apparent. The participation by students and faculty in a variety of discussion groups, thesis defenses, field assignments and undergrad teaching was inspirational. Motivation at the facility generally runs high: most faculty being very active in their fields with students promoting themselves to potential supervisors for this very reason, rather than faculty having to advertise grant money and associated research posts.



It must be said that the academic environment in the States is different to what it is in South Africa in terms of the availability of research funding. Academia is well paid but very competitive, carrying with it a considerable work load. It was amazing to see just how many of the outstanding and well-funded faculty members at CMS have tenure track positions. Nonetheless, exposure to such an environment will inspire you and give you an all important perspective on your research field and work environment. Researchers at CMS are always looking for collaborators and I would recommend to the South African phycologists to consider approaching the CMS faculty in this regard. As for the students, anyone interested in pursuing graduate studies there should contact UNCW Admissions (admissions@uncw.edu) or Dr. Joan Willey (willeyj@uncw.edu) of CMS Graduate Opportunities. UNCW has recently established a PhD program, but it needs to be remembered that this alternates between academic departments every year. A collaborative or study experience at UNCW is well worth it, but if such an experience should materialize for you, don't mention the war!

Enrico Tronchin

Botany Department, University of Cape Town

2. 7th International Marine Biotechnology Conference, St. John's, Newfoundland and Labrador, Canada, 7th-12th June 2005

I recently attended the IMBC held in St. John's, Canada. After 36h of traveling, including a missed connection at Heathrow, I finally arrived. St. John's is situated on Labrador off the east coast of Canada and even though it was summer, it was cold and very often, wet and windy. St. John's is the oldest European settlement in North America and its economy was founded on fishing. Today, St. John's still has a flourishing fishing industry with a large Irish community.

The conference was attended by over 400 delegates (5 from South Africa) and covered many diverse topics including phycology, aquaculture, bioactives (natural products for pharmaceutical application), biofouling, bioremediation, microbiology, genomics

and proteomics, cell and molecular biology, transgenics as well as topics on policy, ethics and sustainability. Presentations included seaweeds, microalgae, fish and other marine organisms as well as microorganisms such as viruses and bacteria. By far the most presentations focused on marine natural products. It was very interesting as the approach was very commercialized – most bioactive compounds were patented and the synthesis of the compounds a big issue for approaching pharmaceutical companies while diversity and conservation issues were largely ignored. There were also many talks on transformation of species. In many cases, I felt that the basic science in understanding how a system worked was largely ignored for the more "biotec" approach to altering the system. It was also very interesting to hear about some of the commercialized aspects of growing microalgae in bioreactors and the methods for harvesting or milking of the microalgae for carotenoids, fatty acids and other compounds.

For the mid-week field excursion I went on a boat trip to an island inhabited by many birds, including puffins. It was extremely cold on the boat with a sea surface temperature of 2°C. Unfortunately, on my trip I did not see any whales although another group did. Icebergs are also common in the seas but we were a bit too early this year.

Overall, the conference was very interesting and worthwhile to attend despite the distance and long traveling times.

Wendy Stirk (Burnett)

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3. 12th Southern African Marine Science Symposium

This year's SAMSS was hosted by the Oceanographic Research Institute (ORI) in Durban. The symposium got off to an excellent start and the choice of uShaka Marine World as venue for the opening function on the Sunday



suggested that the rest of the conference would be of similarly high standard – and indeed it was.



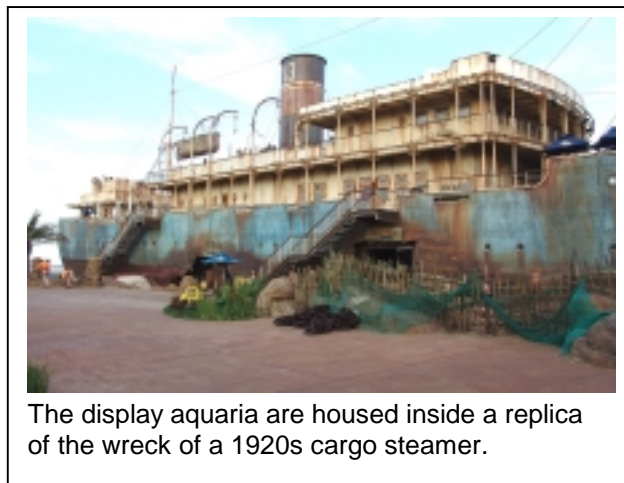
The gateway to uShaka Marine World.

uShaka, according to Rudy van der Elst of ORI, is the fifth-largest marine aquarium complex in the world. Its designers cleverly housed the display aquaria inside a replica of the wreck of a 1920s cargo steamer. The aquarium tour takes one past seven huge tanks occupied (as usual) by sharks, rays, other large fish and some marine turtles, and about 25 smaller aquaria stocked with invertebrates and smaller east coast fish. Of course, as a phycologist the displays leave much to be desired, as only one of the small tanks contained obvious signs of marine primary productivity – *Caulerpa filiformis*; those with a keener eye will also have noticed some crustose corallines in another reef tank. And of course the corals will have had some zooxanthellae. It was amongst these generally algal-impooverished displays of marine life that the welcoming function was held. Rudy gave a five-minute welcoming talk, and everyone filled up on snacks and drinks.

The following morning the delegates gathered at the Elangeni Hotel at the beachfront, and we settled in for four days of solid talks arranged in four parallel sessions. Generally, most of the 230 papers were of excellent standard. About half of the papers were presented by students. As could be expected, oceanographic research or general marine ecology were widely discussed, but there were 24 papers of phycological nature. Many of these were presented by PSSA members.

Four of the 11 talks on microalgae dealt with aspects of harmful algal blooms, and these were

given by G. Pitcher (M&CM), S. Bernard (UCT), A. Fawcett (UCT) and I. Rangel (Instituto de Investigação Marinha, Angola). Another two UCT/M&CM collaborations that gave feedback on their research into phytoplankton dynamics and the remote sensing of phytoplankton primary production were authored by R. Barlow and J. Field, and C. Campillo-Campbell (Centro de Estudios Avanzados de Blanes, Spain) subsequently followed up with a similar talk. Moving closer to the coast, the last four talks dealing with estuarine microalgae come from the Eastern Cape and KwaZulu-Natal and were presented by G. Bate (formerly NMMU), G. Snow (NMMU), P. Gama (NMMU) and C. Thomas (UKZN).



The display aquaria are housed inside a replica of the wreck of a 1920s cargo steamer.

There were many talks on intertidal marine ecology, and Rhodes University strongly dominated in this front. However, only the talk by E. Díaz focused specifically on animal-algal interactions. Both G. Maneveldt and one of his students, L. Madikiza, talked about biological interactions involving crustose corallines in the intertidal zone. Other talks that the organisers fitted into the 'ecology' section included S. Porter's (UCT) attempt to give a biogeographic perspective of the benthic community structure, including macroalgae, of subtidal reefs in KwaZulu-Natal, and R. Anderson's (M&CM) talk on the macroalgae of KZN with an overview of their latest book on the seaweed flora of this region. In his talk, J. Bolton (UCT) discussed his investigative work leading up to the identification of several macroalgae that might have been introduced into South Africa, and thereby coining



the new term 'forensic phycology'. And of course, Southern African phycology would be incomplete without a mention of kelp, and A. Rand (UCT) gave an overview of using a GIS approach to manage this valuable resource.

Three of the talks dealt with the role of seaweeds in abalone cultivation. D. Robertson-Andersson (UCT) spoke about the socio-economic aspects of abalone farming, kelp and alternative feeds; T. Dlaza (UWC) presented the outcome of his studies on the role of feeds manufactured with macroalgal material as abalone feed; and I (UKZN) talked about the role of dimethylsulphoniopropionate (DMSP) in macroalgae and its effects on the taste and quality of cultivated abalone.

One of the most interesting and amusing talks of the symposium, in my opinion, came from P. Steyn (NMMU) who showed why many phycologists over a period of more than 20 years (myself included!) have managed to repeatedly kill *Gelidium pristoides* while attempting its cultivation. Steyn showed that the lack of a detailed understanding of the physiological basis for inorganic carbon acquisition was probably the reason behind all these failed attempts. At last we have an answer. Well done!

The Symposium Banquet at Rayz at uShaka brought to an end the 12th SAMSS. As usual, there was a

feast of excellent food (as with all the conference lunches and teas the preceding few days). Festivities also included handing out the Gillchrist medal to Prof. Peter Best (University of Pretoria) for his years of work on marine mammals. I look forward to the time that a phycologist receives that honour.



A traditional Zulu warrior.

AJ Smit

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GEOHAB

Global Ecology and Oceanography of
Harmful Algal Blooms

4. Invitation to participate in the Core Research Project: HABS in Upwelling Systems

GEOHAB Mission:

Foster international co-operative research on HABS in ecosystem types sharing common features, comparing the key species involved and the oceanographic processes that influence their population dynamics.

GEOHAB is a Plan for Co-ordinated Scientific Research and Co-operation to Develop International Capabilities for Assessment, Prediction and Mitigation.

Members of the scientific community are invited to participate in the GEOHAB Core Research Project [CRP]: HABS in Upwelling Systems. The Open Science Meeting [OSM] report on HABS in Upwelling Systems is now obtainable from the Web: www.geohab.info. Eight key questions have been distilled from the OSM discussions and our understanding of and ability to predict HABS in upwelling systems over the next 5-10 years may reflect the extent to which the CRP can answer these questions.

GEOHAB Core Research should, in accordance with the GEOHAB strategy, be comparative, international and interdisciplinary, focusing on the interactions between the biological, physical and chemical processes controlling HABS. If you are interested in addressing the key questions identified in the OSM report and believe that your research could benefit from comparison with similar work in other upwelling regions, you are encouraged to participate. A Project Committee [Raphe Kudela – USA, Francisco Figueiras – Spain, Teresa Moita – Portugal, Grant Pitcher (Chair) – South Africa, Trevor Probyn – South Africa, Vera Trainer – USA] has been established



in order to implement the CRP. The membership of the committee has been drawn from those scientists actively involved in HAB research in the Californian, Iberian and Benguela upwelling systems, but this does not preclude the participation of scientists from other upwelling regions. Those scientists [or groups of scientists] that wish to participate should therefore inform me [or any other member of the committee] of their specific interests, and propose research related to the eight key questions. The project committee will, based on your response, attempt to facilitate the establishment of these projects primarily through coordination and identification of project membership.

Various projects have already been proposed, e.g. the inconsistency in the toxicity of *Pseudo-nitzschia australis* within different upwelling systems is thought to be a function of either genotypic or environmental variability and may be resolved through comparison [key question E], while uncertainty relating to the mechanisms responsible for the shoreward transport of blooms in upwelling systems is also likely to be resolved by comparison [key question G]. These and many other questions relating to HABs in upwelling systems will benefit from a collaborative effort that will allow the assembly and comparison of data collected in different systems, which will in turn allow the generalization of results and establishment of the existence of recurrent patterns.

I hope you will be enthused by the GEOHAB programme and this CRP in particular, and I look forward to your response.

Grant Pitcher

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Featured Article

Southern African Sustainable Seafood Initiative Development of a National Programme

The overall objective of the project is to develop a countrywide Sustainable Seafood Initiative that seeks to reduce pressure on our vulnerable linefish by increasing voluntary compliance of seafood retailers and decreasing market pressure on problem species through increased consumer awareness. The project will build on initiatives started in KwaZulu-Natal and the Western Cape and seek to develop training courses for seafood retailers in four major metropolitan centres. These courses will seek to raise the levels of voluntary compliance with the Marine Living Resources Act, through increased understanding of the provisions of the act as well as general awareness of the conservation issues and status of our marine resources.

The project also seeks to educate and raise levels of awareness amongst consumers, and consequently seeks to move the market pressure away from species which are either currently banned for commercial sale or which are facing extreme conservation threats. The project will adopt the approach of seeking to inform consumers about the main issues, thus allowing them to make informed decisions.

Implementing Partner: Marine & Coastal Management – www.environment.gov.za

Funder: The Green Trust – www.panda.org.za

Save the Seafood Menu Gastronomic Biodiversity Conservation

Biodiversity has been the conservation buzz-word in recent times, though it remains tricky to explain to non-conservationists exactly why it is better to try and maintain more species than less, especially when the benefits derived from this biodiversity appear largely conceptual. Perhaps in one area of significant consumer interest the benefits of greater biodiversity can be more easily explained: The wonderfully diverse and delectable world of seafood. Just grab your nearest cookbook and flick



to a classic Spanish paella recipe to understand why - the ingredient list should include fish, mussels, clams, squid, and prawns, not to mention a number of terrestrial guest appearances. The seafood industry is essentially built on biodiversity and seafood is undoubtedly the food group that utilizes more species from more different taxa than any other. This is further expressed as a “gastronomic diversity” of tastes and textures that has given rise to unique seafood cultures worldwide. Just think of the sophistications of sushi and sashimi in Japanese culture, the various unique maritime flavours of the coastal Mediterranean regions, the age-old seafood traditions of Scandinavia, right through to good ol’ English Fish ‘n Chips. Even in South Africa we have the “snoek culture” of the West Coast - salt snoek, smoked snoek, and smoorsnoek.



Bunches of Line-fish.

Unfortunately, all is not well in seafood-land. Though markets probably offer a greater variety of exotic seafood due to global trade and modern fishing techniques and technology than ever before, the very sources of seafood have never quite been under so much pressure as right now. Worldwide, the demand for fish grows annually, *inter alia*

because it is seen as a healthy alternative to red meat. But what are the issues? Apart from global environmental concerns such as climate change and grand-scale pollution that also affect the well-being of the ocean and its inhabitants, there are things happening at the ecosystem and species levels that can directly influence what we may or may not see on our seafood menu over the next decade. It really boils down to how we go about catching fish, how many we are catching and whether the natural populations can actually sustain this on the long run. Humans have fished the most remote waters around Antarctica to dazzling depths to bring flaky fish fillets to the consumer’s table. But in many cases we have caught too many fish of a certain species, and it is just about here that your favourite species disappears off the menu, or becomes unaffordable to all but the very wealthy. The standard solution in the fishing world is to switch species and yesterday’s bycatch (the less desirable fish that was not targeted and probably discarded before) suddenly becomes today’s “Catch of the Day”. So we move through the species, though with 75% of the world’s fisheries exploited at maximum levels or overexploited, we are running out of new options.

South Africans may not particularly fancy sea-cucumber sandwiches, but we still harvest well over 300 marine species for use as bait or food, for both recreational and commercial purposes. Of these some 200 species are clumped into the group of linefish – fish that are traditionally caught with a baited line and hook, and arguably the group that faces the greatest problems, apart from the perlemoen (abalone) fishery. The most recent revision of linefish stock status has revealed that out of the top 27 recreationally important species for which sufficient information were available, 18 (67%) were classified as “collapsed”, one species was found to be “over-exploited”, four were considered “optimally-exploited”, and only two species were “under-exploited”. For commercial species it is no different with six out of the ten most important commercial species falling well below critical levels in the Western Cape region, where the bulk of national linefish catches are made. Some well-known species like the dusky kob are estimated to be down to 2% of original



spawner-biomass per recruit levels. As a crude comparison, imagine if the estimated human population of 4 million for the Cape Metropole were reduced by 98%. That would leave a cool 80 000 people, and a vast improvement in peak hour traffic!

To further compound the problem, there exists a general ignorance amongst seafood retailers and consumers about the crisis. This was clearly illustrated by survey results from 29 retailers and restaurants in the Durban and Cape Town areas. Around 80% in both cities were unaware of the Marine Living Resource Act of 1998 that prescribes how our marine resources are utilised. In KZN a full 94% of those interviewed proved to be knowingly or unknowingly contravening the act in one or more way. This was mostly through buying fish from recreational fishers, or offering no-sale species for sale. Perhaps equally alarming was that 4 of the 12 most popular fish in KZN were species that are classified as over-exploited.

The results from KZN at least urged E-KZN Wildlife to initiate a “Sustainable Seafood Initiative” which sought to develop training courses for restaurants and seafood outlets in order to inform them about legal aspects when dealing with seafood, how to identify problem species, and general fisheries related conservation issues. Along with the course, training materials such as identification books and posters were also planned. At the Two Oceans Aquarium in Cape Town a similar need was identified, and at this stage it was realised that there was actually a national need for a campaign that educates retailers and consumers alike about fish and seafood issues. A partnership was born between the WWF South Africa: Marine Programme and The Department of Environmental Affairs and Tourism as primary funding partners, with E-KZN Wildlife and the Two Oceans Aquarium as implementing partners. Funding was procured from The Green Trust for three years to employ a national co-ordinator who is guided by a steering committee that enjoys representation from all partners, as well as TRAFFIC (joint wildlife trade monitoring programme of WWF and IUCN - <http://www.traffic.org/>) and the South African Association for Marine Biological Research (SAAMBR). The national co-ordinator took to post

in November 2004, and is based at Marine and Coastal Management at the Foreshore in Cape Town.

The advent of the initiative, renamed the Southern African Sustainable Seafood Initiative (SASSI) comes at a time where international consumer awareness has become a current topic. In the past few years a number of similar campaigns have been launched in the United States, Australia, New Zealand, Scandinavia, the United Kingdom, and others. These efforts have been at various levels of intensity: From basic websites dealing with fisheries-related issues, through to nationwide educational campaigns that arm consumers with wallet cards that suggest best and worse seafood choices, based on extensive species databases that use detailed species-by-species and issue-by-issue evaluation criteria. In these countries consumers are increasingly demanding information from retailers about the origins of their seafood, whether it is wild-caught or farmed, and what the impacts of the fishery are. This new level of consumer awareness is captured perfectly by this extract from an article by Steve Billings in the trendy Metroactive online magazine for the San Francisco area, 22 September 2004, titled: “*Making Waves. Sustainable seafood could be the most important new trend in environmentally conscious eating*”

“Sometimes simple questions are the hardest to answer. If you've ever worked in a grocery or a restaurant offering seafood, then you've certainly gotten this doozy: "Is the fish fresh?"

Of course it is! Would we serve it if it wasn't?

But wait, what's your definition of fresh? Caught this morning? Yesterday? Caught, then immediately frozen, thawed this morning and served today?

If you really enjoy seafood, want to keep eating it and want your kids' kids to experience it, an even better, harder and more relevant question should run something like, "Is this fish caught by sustainable methods that consider factors of pollution, bycatch, habitat destruction, the biological sustainability of the species and the overall health of the ocean?"

SASSI hopes that by providing accurate and relevant information and widely publicising seafood issues, local consumers will be able to



field similarly awkward questions, and that restaurateurs will be able to answer them satisfactorily. After all, it makes business sense to keep the customer happy, and to make sure you have a sustainable supply of the product that you are selling.

The nature of the partnerships that make up SASSI reflects the commonality of goals of the partners. Sustainable consumption has become a focal point for many international NGOs, who try to promote changes in lifestyles that ultimately empower consumers through their choices. WWF International is in the process of appointing a Sustainable Seafood Officer that will focus on four main areas:

- 1) creation of fish guides and promotion of member awareness of sustainable seafood;
- 2) promoting support for Marine Stewardship Council certification;
- 3) retailer and food service sector engagement;
- 4) promoting continuous improvement in the seafood sector.

WWF now has 13 national offices with sustainable seafood projects.

From a governmental angle, constructive engagement with the public and clarity about legislation and the underlying reasoning behind management decisions can greatly supplement traditional management tools, compliance and law enforcement. Aquaria worldwide are becoming increasingly aware of their role as public educators. The industry at all levels should view sustainability as a priority to ensure long-term stability and security. Finally, if consumers do not start viewing themselves as stakeholders with voices in the management of marine natural resources, they are most likely in for some boring and depleted seafood menus in the future.

Jaco Barendse

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Popular Student Article

Mapping South Africa's Kelp Beds

Andrew M. Rand

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Many of the world's kelp beds have been mapped and studied for scientific and management purposes. This information is generally incorporated into a database and along with time series data, may be stored in a Geographical Information System (G.I.S.). A comprehensive data collection and mapping exercise of South Africa's kelp beds has yet to be completed. This is essential in light of the increased commercial demand for kelp (see figure 1).

The process timeline for the creation of a kelp bed inventory (see figure 2 for a study site and mapping overview of the west coast of South Africa) may be simplified as follows:

1. Uncover previous research:
 - a. Non-overlapping Aerial Print Infrared Surveys done in 1983 for the purpose of mapping abalone habitat (Tarr, 1993); and in 1995 (Marine & Coastal Management, unpublished data).
 - b. Landsat 7 ETM+ (image interpretation done by Ocean Image [unpublished]) in 2002.
 - c. Diving surveys conducted by Marine and Coastal Management and other researchers.
2. Identify areas that remain unsurveyed and co-ordinate an aerial survey. For the first time, *digital* infrared aerial photography with on-board location recording was done for parts of the South African coast in 2005.
3. Check on the validity of the imagery acquired by means of ground truthing. This involved fieldtrips at selected sites, with the aid of boats, kayaks and GPS.
4. Integrate all data into a G.I.S.
5. Investigate the kelp biomass at a number of sites for the calculation of standing stock.
6. Insert relevant management information (harvesting records).

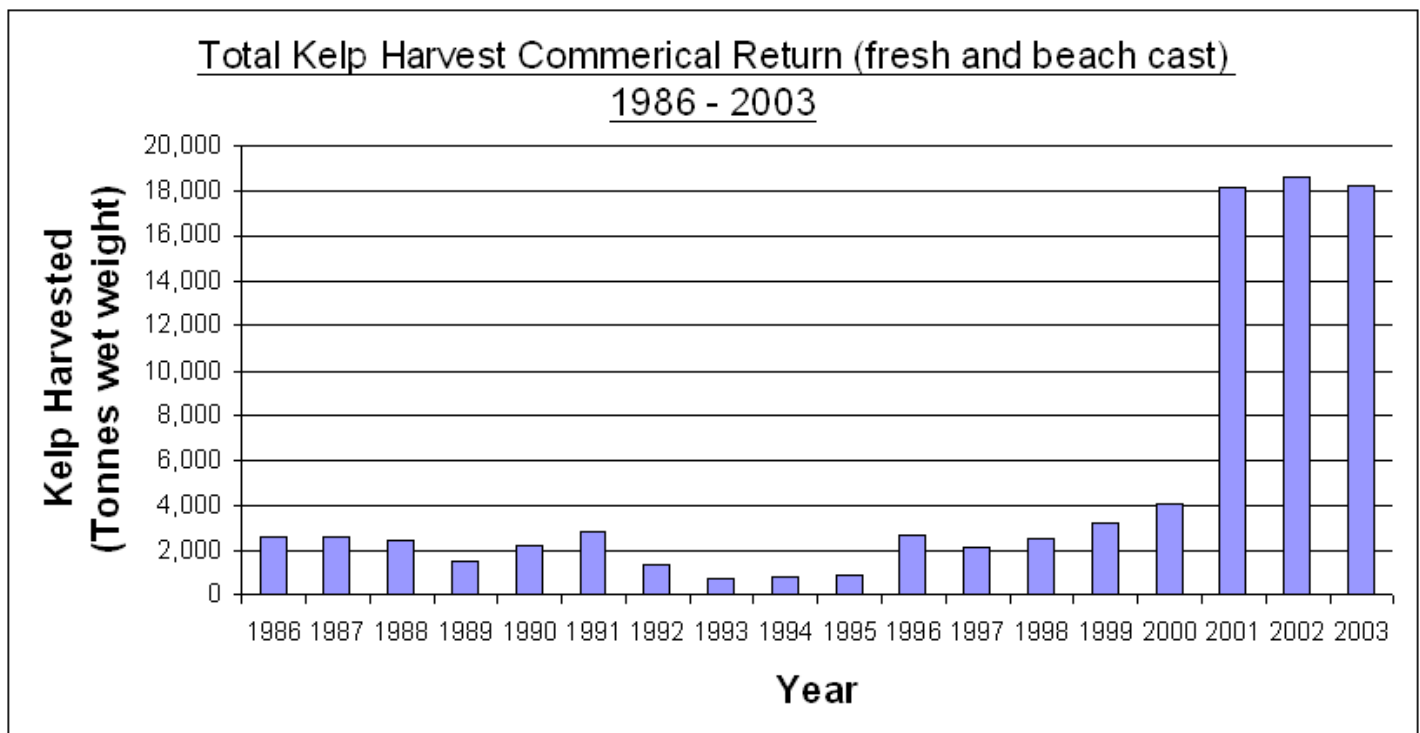


Figure 1. Total kelp harvest commercial return (data sourced from the Seaweed Unit, Marine & Coastal Management, DEA&T [unpublished]).

Overview of area surveyed

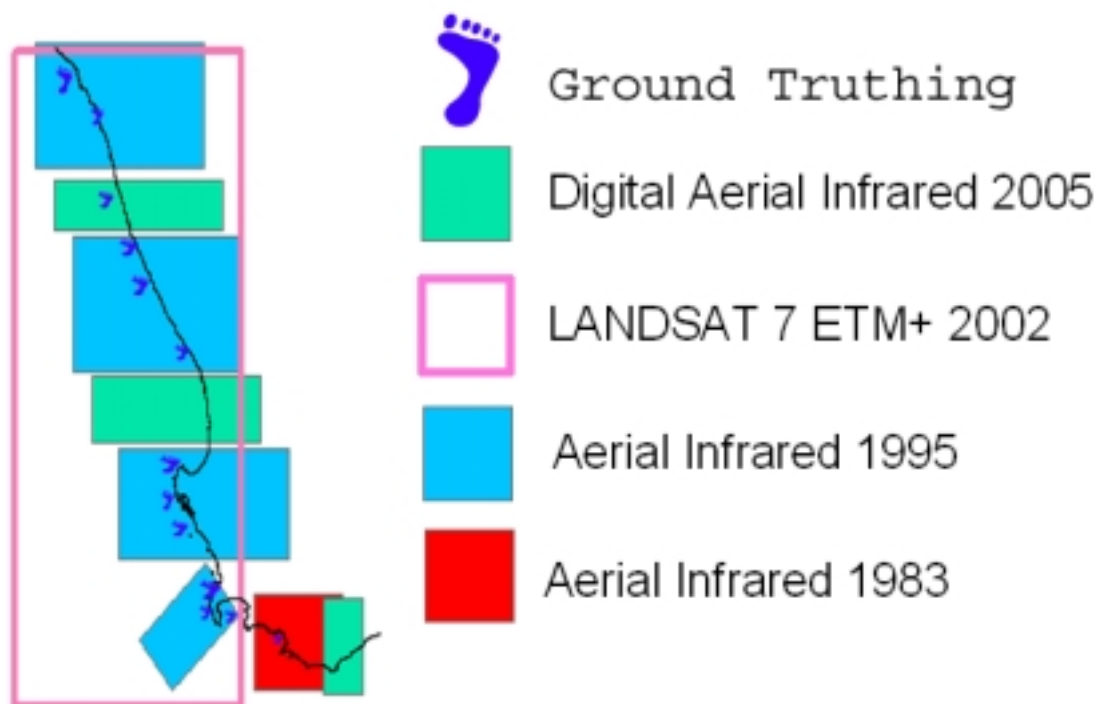


Figure 2. The geographical extent of existing and new databases of kelp beds.



An example of the use of digital infrared imagery

The image alongside (Figure 3) shows a portion of the coastline north of Hondeklipbaai surveyed by a commercial aerial photography company (Geospace) with funds obtained from the Department of Environmental Affairs and Tourism (DEA&T).

The following features may be identified: Land (top right), sandy shore, seawater (black), white waves and infrared-light reflecting material (top-centre: red patches on the shoreline and out to sea). The red areas include intertidal seaweeds, kelp beds extending out to sea and beach cast material.

A series of computational algorithms are run on the image to process the data into groups that represent each of the features listed above. Each of these features has a unique spectral signature/characteristic that allows it to be identified, and the surface area calculated. Once this image is in the G.I.S., the geographical area may be calculated. With the addition of biomass information, the standing stock may also be calculated. This technology is useful as similar methodologies could be applied by, for example De Beers Marine Namibia, to map Namibia's kelp beds.

The work done in this project aims to provide resource managers with a good approximation of the state of kelp beds in South Africa. This will allow for more equitable allocation of harvesting rights in the future.

References

1. Tarr, R.J.Q. 1993. Stock assessment, and aspects of the biology of the South African Abalone, *Haliotis midae*. Masters of Science Dissertation. Unpublished, University of Cape Town.

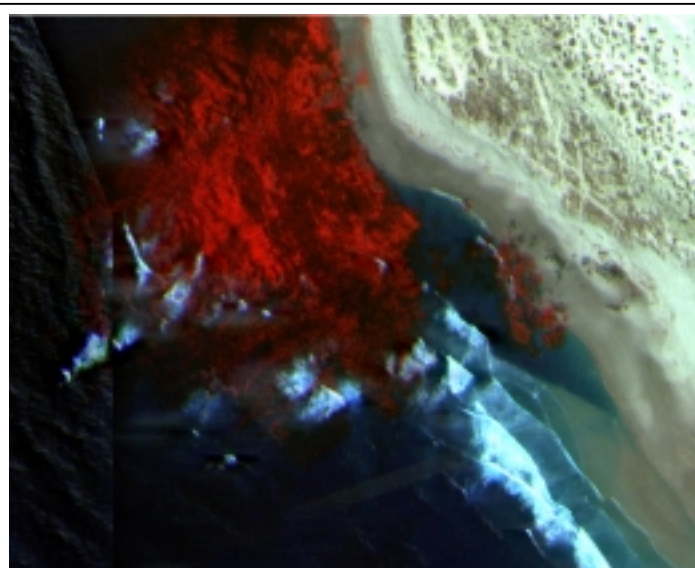


Figure 3. Infrared aerial imagery of the coastline north of Hondeklipbaai.

Conference Countdown

The PSSA annual general meeting for 2005 will be held at the IPC8 in Durban, August 2005. For those members attending IPC8, the conference organisers have been kind enough to secure a venue for the AGM.

DATE: SUNDAY, 14 AUGUST 2005

VENUE: ICC DURBAN

ROOM: 11A

START TIME: 13H45

Please note that the following PSSA Congress will be held in July 2006 before reverting to a date in January in 2008. John Bolton from UCT will host the July 2006 Congress.

Calendar of Events

Upcoming Conferences

1. A joint meeting of the 59th annual meeting of the Phycological Society of America and the 8th International Phycological Congress (IPC8), Durban, South Africa, 13-19 August 2005, <http://www.ipc8.org.za/>.
2. 7th Conference of the Aquaculture Association of Southern Africa, Grahamstown, South Africa, 12-16 September 2005,



- <http://www.aasa-aqua.co.za/>.
3. 3rd Health Sea International Symposium, Granville, Normandie - France, 6-7 October 2005, <http://www.health-sea.com/>.
 4. Diversitas Open Science Conference, Oaxaca, Mexico, 9-12 November 2005, <http://www.diversitas-osc1.org/>.
 5. The 6th Asia-Pacific Conference on Algal Biotechnology, Makati City, Philippines, 12-16 October 2006, <http://www.bio-edge.cn>.
 6. The XIX International Seaweed Symposium, Kobe, Japan, 2007.

