



Reef Watcher Production

Contributions welcome: info@reefwatch.asn.au
All contributions are subject to editing.
Deadline for next issue: 14th August, 2009

South Australia's new shark research program

The Southern Shark Ecology Group (SSEG) is a new group that was recently created following the establishment of a Shark Ecologist position within South Australia based at SARDI Aquatic Sciences and Flinders University (funded by Marine Innovation South Australia). Although a relatively new group, the SSEG is already actively involved in several projects as well as developing a range of new studies.

Paul Rogers, a PhD student at Flinders University and a staff member at SARDI, has been studying the movements and migratory patterns of shortfin makos (*Isurus oxyrinchus*) using a combination of satellite and archival tags. Ten sharks have now been tagged. A couple have already travelled amazing distances swimming from South Australia to Ningaloo Reef in as short as two months. One of the sharks travelled over 15,000 km in about a year, and swam to a depth of 700 m. Curiously, some other Makos remained close to where they were tagged in the Great Australian Bight during the entire monitoring period.

Crystal Beckmann is another PhD student who started recently. She is looking at new non-lethal techniques to investigate the diets of sharks. The most common method previously used relied on dead sharks

and their stomach contents to identify prey items. Crystal's new technique uses small amount of flesh samples to analyse the concentration of fatty acid, which can indicate what the sharks have been eating.

Whaler sharks are commercially targeted in South Australia, with the fishing operations mostly taking place in summer by longliners. A new project is currently being developed to investigate the biology and ecology of these whaler sharks. Species identification, catch composition, reproduction, age and growth, and diet are part of the components of this project.

A lot of work is currently being undertaken to learn more about the movements and migrations of white sharks by CSIRO using satellite and acoustic tags. Some of these sharks have also travelled enormous distances from the Neptune Islands to Ningaloo Reef (WA) and Rockampton (Qld). The SSEG is collaborating with CSIRO by deploying acoustic receivers within South Australia that can detect white sharks tagged around the Neptune Islands and off the NSW coast. Furthermore, the SSEG will also be investigating fine-scale movements and swimming patterns of white sharks to determine their behaviour around seal and sea lion colonies.



Dr Charlie Huveneers, SAs new shark ecologist, tagging a wobbegong.

Finally, an Honours student will be using Port Jackson egg cases to study the osmoregulation mechanisms of sharks and assess how these might change during their developmental stages. The osmoregulatory ability of the embryos will be tested under different salinity levels assessing the capability of the embryos to withstand salinity changes.

With the help of many collaborators and partners, the SSEG will be working hard to undertake research on sharks and rays in South Australia. The results obtained from the different projects will help scientist to answer some of the questions about the ecology and biology of sharks that have remained unsolved until now.

Thanks to Dr Huveneers for contributing this article.



Clean up the Bay day!

Community-based marine monitoring programs like Reef Watch, are now slowly spreading around Australia. There is a Reef Watch Victoria that has been active for quite a few years, and also in Victoria a Sea Search program that includes seagrass monitoring. In Queensland there is a Reef Check program and a Seagrass Watch program. In Tasmania there is Kelp Watch. In addition to all of these there are individual programs being run by park rangers in various marine parks, and the national reef monitoring program, Reef Life Survey, about whom we reported in a previous issue.

In New South Wales, there are the Harbourkeepers and Coastkeepers and now a new group, Botany Bay Watch. Here is their story from founder, Carl Fallon:

Botany Bay Watch is a volunteer-based environmental community group dedicated to protecting and monitoring the beautiful diversity of Botany Bay. Involving divers and non-divers alike, we participate in organised Clean Ups around the Bay approximately every 6 weeks. These have included *Clean up Australia Day* in March and *Splash for Trash* last September. June 13th will mark our first *Clean up the Bay*

Day with volunteers collecting rubbish above and below the water at various locations around Botany Bay. In addition to Clean up events, we also conduct fish abundance surveys to monitor the biodiversity of the Botany Bay Catchment.

Clean Up the Bay Day aims to follow in the steps of *Clean Up Australia Day* as one of the important community-based environmental events for the region. In the years to come, we expect it will gain momentum through the generous support of National Parks, Randwick Council, individuals, businesses and other community groups around Botany Bay.

Last year we had 49 volunteers (19 divers and 30 on-shore) participate in *Clean Up Australia Day* collecting 4800 pieces of rubbish at Frenchman's Bay La Perouse. This year we returned to Frenchman's Bay with 50 volunteers collecting 360kg of rubbish!

We analyse and keep records of all rubbish collected so that over-time we will be able to identify trends and changes and hopefully make targeted and informed recommendations to decision makers to improve the health of the Bay.

We also aim to:

- Remove substantial amounts of

rubbish from bush land areas and reserves not regularly serviced by Council Local Asset Services

- Identify problematic illegal dumping sites
- identify problematic areas
- Improve the Bay's numerous parks, reserves and waterways

How can you help?

Volunteers can register by emailing events@botanybaywatch.com.au with your full contact details. You will be contacted shortly thereafter with full event details. If you have any small children please say so in the email, and you will receive a Weedy-Sea Dragon Colour in Entry Form with the reply. All colour in entries will be displayed on the day at the Randwick Council stand! Make sure you bring the whole family. There will also be supervised and self discovery rock pool activities on the day, so there is something for everyone.

Post Clean Up

Once all the rubbish (and data) has been collected we are organizing a thank-you event for all the volunteers to celebrate their commitment to preserving the bay. Details will be released closer to the date.

We hope to see you there!

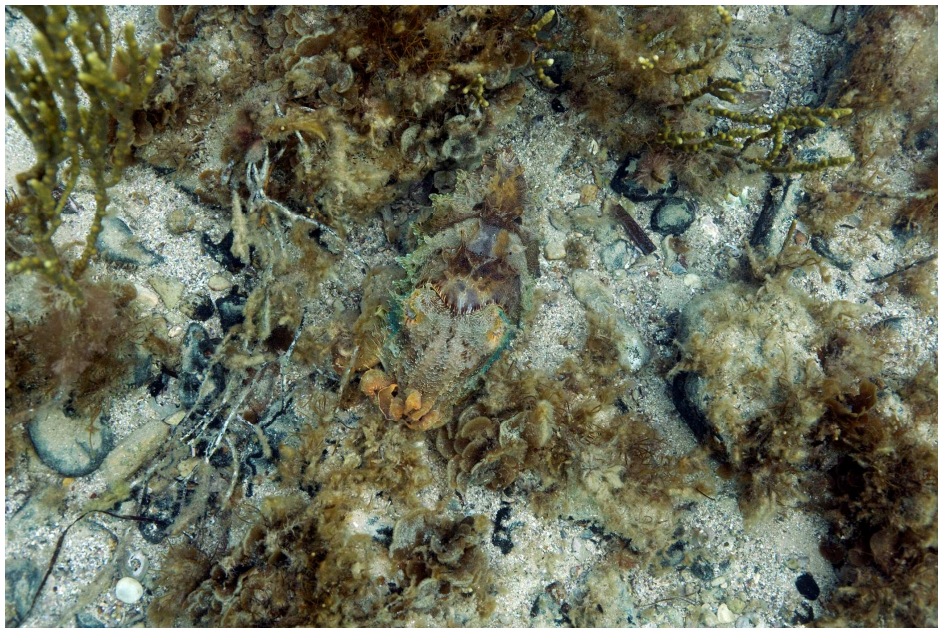
Check out the Botany Bay Watch website for more information:

www.botanybaywatch.com.au



Cuttlefish camouflage

By Roger Hanlon, Senior Scientist, Marine Biological Laboratory, Woods Hole, USA



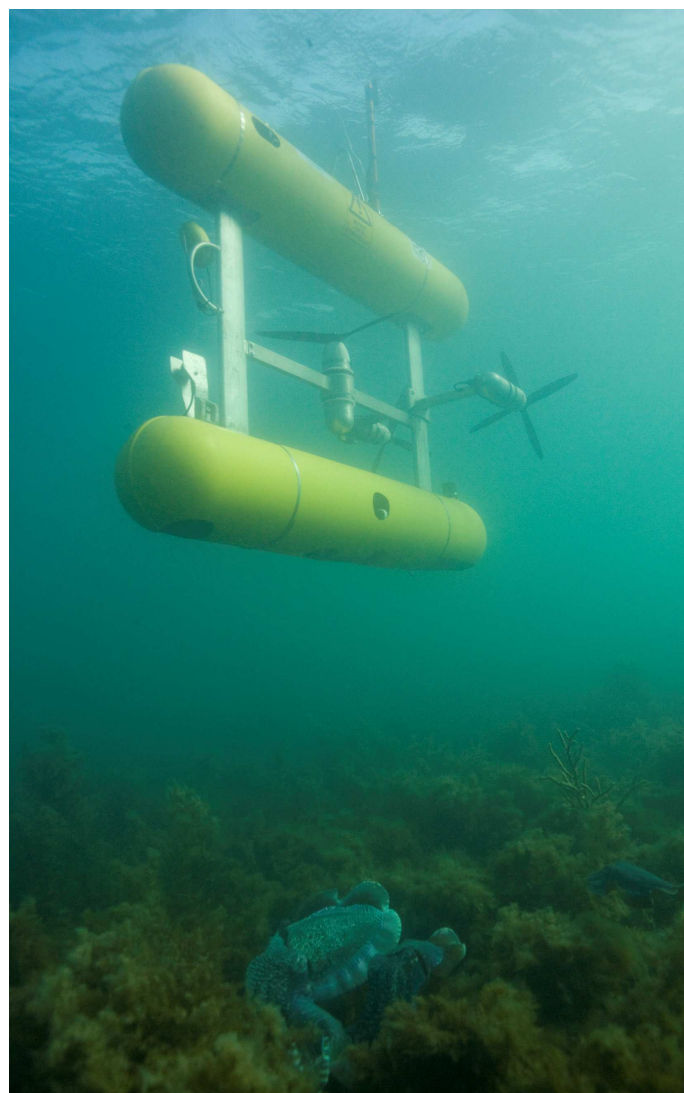
Both images are by Roger Hanlon.

Not every cuttlefish at the unique Whyalla spawning ground is showing conspicuous visual signals for reproductive success. Many of them can be found quiet and well camouflaged (as above). During the past 3 years my colleagues (especially Justin Marshall and his students at the University of Queensland) and I have studied how and why they do this.

First, how do they decide which pattern to use with different visual backgrounds? Our studies of their visual perception have revealed that they use rather simple visual cues from the background to decide on the most effective camouflage pattern. This is quite magical since they do it so rapidly - within the time space of an eye blink. Part of the magic lies in the patterning repertoire of the cuttlefish: they appear to have only three major pattern types to achieve camouflage on diverse backgrounds. Of course, there is a good deal of variation on the three types of camouflage patterns, termed Uniform, Mottle or Disruptive. We are seeking the “visual sampling rule” for each of the three pattern types and have made substantial progress in this endeavor. The idea is this: to explain the swiftness of pattern change as the cuttlefish move to a different visual background, there must be some simplifying process that the eyes and brain use to assess the complex visual scenes and achieve the “correct” camouflage pattern.

Second, what are the cuttlefish doing at night? Our night diving, augmented with small underwater vehicles (image right), has led to the discovery that cuttlefish go into the camouflage mode at night. Surprisingly, each cuttlefish uses a tailor-made camouflage pattern for each small “microhabitat” in which it rests. This means that cuttlefish vision at night is excellent, and that predator vision at night must be excellent as well; otherwise, the cuttlefish would not bother to camouflage at all, or they would all use just one camouflage pattern regardless of the different visual backgrounds. Third, our night studies indicate that, although the camouflage pattern is excellent, the color of the pattern seems not to be very well tuned to the adjacent backgrounds. Thus, in daytime the camouflage pattern is color-coordinated, but at night the color match is not very good, indicating that color vision by predators does not work at night (a fact well known for other organisms).

Fourth, how good is the camouflage match to the background during the day? Using spectrometers (in special underwater housings) that measure every wavelength of visible light, we have begun to carefully compare small patches of the skin of camouflaged cuttlefish to adjacent patches of the background under changing light conditions (clouds, sun, surface ripple, etc.). Initial results indicate that somehow, the visual capabilities of the cuttlefish are able to “replicate” the brightness and color of the background in their skin with considerable precision. This is particularly vexing because cuttlefish are colour blind. A great deal more needs to be discovered about these and other facets of the remarkable abilities of the giant cuttlefish, and the Whyalla spawning grounds provides the single best location in the



Dr Hanlon worked with Dr. Stefan Williams and colleagues, at the University of Sydney, to get night images of camouflaged cuttlefish using this Australian AUV.



Conservation Council
of South Australia Inc

QUIZ NIGHT

Friday 25th September

7 pm for a 7.30 pm start

**An audio-visual
extravaganza
of fun, frivolity, fiction & fact**



for the diving community

*Form a table or let us find you a seat!
There will be something for everyone –
you do not need to be a marine biologist,
diver or involved in Reef Watch.*



Image: Rob Kirk

Loads of fantastic prizes!

Location: Goodwood Community Centre

(access off Florence St., behind the library)

Cost: \$10 (\$5 unwaged) pay on the night

Catering: BYO food and drinks

Bookings essential — numbers are limited: include table name, captain & contact details.

Email info@reefwatch.asn.au or phone 8223 5155.



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Government of South Australia
Adelaide and Mount Lofty Ranges
Natural Resources Management Board



Tasmania's iconic giant kelp forests nominated as threatened under Federal Law

Humane Society International has nominated Tasmania's giant underwater kelp forests (*Macrocystis pyrifera*) as a 'Threatened Ecological Community' under the federal *Environment Protection and Biodiversity Conservation Act 1999*. Environment Tasmania is supporting this nomination and progressing an equivalent listing in Tasmania.

"Tasmania's giant kelp forests are unique and iconic, renowned both in Australia and globally. They are incredibly important ecosystems supporting a high diversity of plant and animal species, providing habitat for economically important populations of rock lobster and abalone, and are socially important areas for enjoyment and appreciation of our spectacular marine environment. Yet on the east coast of Tasmania they have been in serious decline for many years," said Danielle

Annese from Humane Society International.

"Despite our giant kelp forests being ecologically, economically and socially important, they have been offered little protection in Tasmania. These ecosystems are like the coral reefs of our cool water marine environments, and yet we have stood by and watched them decline drastically over recent decades," said Rebecca Hubbard of Environment Tasmania.

"Changes in nutrient availability, sea surface temperature, invading marine pests and fishing impacts are having a compounding impact on these unique ecosystems, and they must be offered extra protection or we may see their extinction in our lifetimes," said Ms Annese.

"If successful, the nomination of the giant kelp forests as a threatened ecological community under federal law will help us to better protect



Image: Craig Faulds. Kelp on Tasmania's east coast

these crucial ecosystems. Combined with nomination under state law, we could help to secure the future of this iconic ecosystem, before it's too late," concluded Ms Hubbard.

World Oceans Day - now official!

In 2008, the United Nations General Assembly decided that, as from 2009, **8 June** would be designated by the United Nations as "World Oceans Day" (resolution 63/111, paragraph 171). Many countries have celebrated World Oceans Day following the United Nations Conference on Environment and Development, which was held in Rio de Janeiro in 1992, but until now it was not formally endorsed by the UN.

The oceans are essential to food security and the health and survival of all life, they power our climate and are a critical part of the biosphere. The official designation of World Oceans Day is an opportunity to raise global

awareness of the current challenges faced by the international community in connection with the oceans.

The theme of the inaugural observance of the World Oceans Day by the United Nations in 2009 is "Our Oceans, Our Responsibility".

The Ocean Project are asking supporters of World Oceans Day to wear blue on the day - so join in and show your support! World Oceans Day provides an opportunity each year to celebrate our world ocean and our personal connection to the sea.

Why not use World Oceans Day to take action for the oceans?

- Take a pledge to join Reef Watch monitoring activities on a more regular basis.
- Learn about sustainable seafood.
- Write a letter to your MPs, local and federal, and tell them your concerns for our oceans.
- Do an energy audit to see how you could reduce your energy use.
- Organise a Feral or In Peril dive.

Celebrate our oceans by telling us your stories. Why do you love the oceans? What do you do in your everyday life to lessen your impact on the oceans? In the next issue, we will print some of your stories, and the positive actions you are all taking.

Many thanks to our generous sponsors and supporters

This project is supported by the Conservation Council of SA, through funding from the Australian Government's Caring for our Country and the South Australian Government.

Reef Watch also acknowledges the generous support of the diving industry for Reef Watch events.

Supporting organisations include:

- Adelaide and Mount Lofty NRM Board
- Northern & Yorke NRM Board
- Primary Industries and Resources SA
- SARDI, Aquatic Sciences
- Department for Environment and Heritage



Government of South Australia



CARING FOR OUR COUNTRY



Conservation Council of South Australia Inc

If undeliverable return to:

Conservation Council of SA
Level 1/157 Franklin Street
Adelaide 5000
SA

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Australia



Help save time, money and the environment! Please send me Reef Watcher via email only. Email your details: info@reefwatch.asn.au

New Whyalla Nautiguide!

If you are a fan of the Whyalla cuttlefish, but haven't yet got round to actually diving with them, then you need this new Nautiguide.

Nautiguides are becoming increasingly popular as a guide to some of South Australia's best dive sites such as Port Hughes and Edithburgh, both of which sold out! Reprints are on the way.

The new edition contains a feature by Dr. Roger Hanlon,

and the best thing about the newly designed Whyalla Nautiguide is that the Whyalla City Council and the Eyre Peninsula Natural Resources Management (NRM) Board have agreed to fund the production of 10,000 copies, available for a gold coin donation—the proceeds of which will be donated to Reef Watch!

We will ensure that the funds raised from the Whyalla

Nautiguide go towards Reef Watch activities on the Eyre Peninsula.

So get your Whyalla Nautiguide now!

Thanks to Nautiguides founder, Will Scapens, for being such a great Reef Watch supporter. Thanks also to the Whyalla City Council and the Eyre Peninsula NRM Board. www.nautiguides.com

