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Conservation Council of South Australia Inc

Reef WATCH South Australia

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Dragon Search update

by Janine Baker

Dragon Search South Australia has now officially ended. Fortunately, the Reef Watch website now houses most of the information from the Dragon Search website and can still accept sightings.

Included on the website are several reports on the Dragon Search program data. Sighting data were collected regularly by divers, snorkellers and beachcombers from the early 1990s through to 2005, and although the program is no longer running, sighting forms can still be submitted to Reef Watch, for future analysis. Several reports for the southern States, plus a National overview report, each contain the following information on leafy and weedy seadragons:

- number of Dragon Search sightings by divers and beachcombers in each "bioregion" of the southern States, from 1990 to 2005
- seasonal summary of sightings
- proportional summary of sighting modes (diving, snorkelling, beachcombing, other)
- habitat details
- observed behaviour
- numbers and observations of seadragon groups and single seadragons
- brooding male seadragons (number observed, location, seasonal summary, behaviour etc)
- juvenile seadragons (numbers, locations, seasonal summary)
- seadragons in the beachwash (locations, numbers, seasonal summary, "mass" aggregations)
- other data (depth range, water temperate range of sightings)
- sites of particular note and frequent recording (e.g. summary of popular locations in each State where seadragons are reliably recorded over time, plus observations on the significance of jetties / piers, shipwrecks and other artificial reefs as seadragon habitat)
- miscellaneous data (seahorse and pipefish sightings, other notable species)
- notes on perceived threats to seadragon populations.

Each report also contains summary maps of seadragon sightings in each bioregion, including brooding males, and beachwash records. There is also a summary of pre-Dragon Search sightings in South Australia (1963-1989).

Some of the notable results emerging from the Dragon Search program data include:

- information on the main season of breeding, apparent in each southern Australian State;
- an extension of the known northern geographical limit of leafy seadragon distribution in Western Australia, and weedy seadragon distribution in New South Wales;
- edge of range records for leafy seadragons in South Australia, including infrequent records from northern Spencer Gulf, and the lower south east of South Australia;
- two records of leafy seadragons in northern Tasmania (which is not part of the published distribution);
- the utilisation of a variety of natural substrates (kelp beds, other macroalgae-covered reefs, seagrass beds, and mixed habitats, such as macroalgae, sponges, seagrass and rubble) as habitat for both species of seadragon;
- the significance of artificial reefs (particularly jetty pylons and shipwrecks, but also car tyre reefs, metal debris and other structures) as habitat for seadragons.

Weedy seadragon by John Lewis

If you would like to learn more about these remarkable endemic Australian fishes, and see examples of the significant contribution that volunteer divers and beachcombers have made to our understanding of them, have a read through the Dragon Search reports: http://www.reefwatch.asn.au/reports.html#ds.

Desalination and cuttlefish by Jacqueline Dupavillon

With seawater desalination expanding rapidly across the coastal regions of Australia, it is vitally important that ecological studies are undertaken to determine the effects of brine discharge on the marine assemblages in the area. The giant Australian cuttlefish, *Sepia apama,* form a unique spawning aggregation every winter in the upper Spencer Gulf. Hundreds of thousands of animals migrate into a restricted area between Black Point and Point Lowly to breed and this behaviour is not exhibited by any other cuttlefish in the world. The habitat is also unique as it is characterised by flat quartzite bed rock, which lies within shallow water making it ideal for egg laying purposes. Unfortunately this population of cuttlefish is under threat from industrial development. The largest seawater desalination plant in the southern hemisphere has been proposed to be built at Port Bonython, near Point Lowly in the upper Spencer Gulf. Effluent consisting of highly concentrated brine will be discharged in the vicinity of the breeding ground of this species.

My honours research involved determining the abundance of the cuttlefish eggs within the breeding aggregation between Point Lowly and Black Point to find out where the key egg laying sites were. The results indicated that most of the eggs were primarily within a 1-2 km region around Stony Point, which were furthest from human induced influences. Substrate type is also important for the egg laying process as the cuttlefish require hard, slatey bedrock to which to attach their eggs. It is therefore possible that substrate type has influenced these key egg laying areas. Knowledge of the key egg laying sites can contribute to a more informed decision as to where an intake and discharge pipe for seawater desalination should be placed.

Water quality and environmental parameters within the breeding aggregation were also determined to form a baseline data set pre-desalination. There were certain areas within the breeding aggregation that had high background levels of nutrients and certain trace metals. As these constituents are doubled in the discharge brine it is important that the discharge and intake pipes are not placed near these areas.

Developing cuttlefish embryo within egg capsule © Jacqueline Dupavillon

I also conducted an experiment that investigated the effects of different concentrations of desalination brine on the growth, survival and condition of cuttlefish embryos. Eggs were collected from the breeding ground and the experiment involved tanks containing embryos that were maintained at various salinities using desalination brine. Salinity is measured in parts per thousand (‰ or ppt), which is how many parts of salts there are to parts of freshwater. Salinities tested ranged from 39‰ (normal seawater salinity) to 55‰ (unmixed brine). The brine used was considerably low compared to typical desalination brine which generally ranges from 70‰ to 80‰ (double the salinity of the seawater used) and this is the proposed salinity range for the brine for the Port Bonython plant. The results indicated that weight and mantle length decreased with increased salinity. The survival of embryos also decreased with the increase in salinity, with no embryos surviving to full term in salinities greater than 50‰. The egg capsule of the embryos absorb important nutrients and oxygen through the egg capsule membrane that are taken up by the embryo during development. If the embryo does not receive enough oxygen and essential nutrients and trace elements, its development may be inhibited and both mortality and underdeveloped hatchlings occur. This means that once hatched the smaller or malformed individuals have a lesser chance of survival as they will not be able to swim efficiently to escape predators or to capture prey.

The giant Australian cuttlefish has a very short life span (12-18 months) and therefore the strength of one generation is highly dependant on the strength of the previous generation. This implies that any detrimental affects from desalination may be catastrophic for the population as a whole. The potential placement of the feed water and discharge pipes need to be taken into account. The constituents of the brine effluent are determined by the properties of the feed water. Any feed-water containing elevated concentrations of salt, as is found in the upper Spencer Gulf, and high levels of nutrients and trace metals should be avoided. The region of high egg abundance should also be avoided as a location for the feed water and discharge pipes as not only will the brine have an effect on the developing embryos, but the infrastructure of the pipes themselves will dramatically disturb the unique egg laying habitat.

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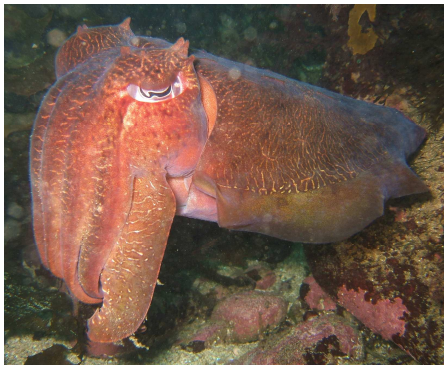

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DEH Marine Threatened Species program

Late last year Dr Simon Bryars joined the Department for Environment and Heritage (DEH) as their Marine Ecologist – Threatened Species. This newly-created position filled the marine void within DEH's Threatened Species Unit which had until that time focused on terrestrial plants and animals. The Marine Threatened Species Program deals with species that are already listed as protected and/or threatened under International, National, and State legislation, and with species that require listings. The Marine Threatened Species Program has close ties with the Coast & Marine Conservation Branch of DEH and, in particular, working out how marine parks can best be utilised to protect threatened species.

Simon's role includes the following activities:

- Ensuring that protected and/or threatened marine species are considered in coastal developments, fisheries and aquaculture operations, and marine planning processes.
- Facilitating research and monitoring that will increase biological knowledge of threatened and near-threatened species.
- Reviewing, prioritising and driving new listings of threatened marine species.
- Facilitating implementation of conservation and threat mitigation measures.
- Informing other government programs, and raising community and industry awareness.

Australian sea lion at Baudin Rocks, by Simon Bryars

So far, Simon has been working on a range of activities including:

- Facilitating research on the potentially-threatened harlequin fish, western blue groper, and western blue devil.
- Creating a GIS database of reef fish abundance and distribution in SA.
- Facilitating a survey of the endangered osprey and white-bellied sea-eagle in SA.
- Threat mitigation for the endangered Australian sea-lion.

Simon can be contacted on 8222 9424 or bryars.simon@saugov.sa.gov.au

Yet more new sponge species

Marine researchers say they may have uncovered a number of completely new species of sponges at Geographe Bay, south-west of Bunbury. A marine study has uncovered 70 different types of sponges of which 90 per cent are unnamed.

University of Western Australia marine biologist Peter Barnes hopes to get the sponges identified by the conclusion of the study this month.

He says the sponges are among the most diverse and beautiful species he has ever seen in temperate seagrass meadows.

"We've got great big purply fingers, masses that rise above the seagrass for a metre or so, these bright pink football size sponges, vibrant yellow golf ball size sponges adding these little patches of colour across this vast expanse of green seagrass matter," he said.

Source: ABC News

Tethya species with pycnogonid © Peter Barnes

Many thanks to our generous sponsors and supporters

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Other supporting organisations include:

- Primary Industries and Resources SA via SARDI Aquatic Sciences
- Department for Environment and Heritage

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

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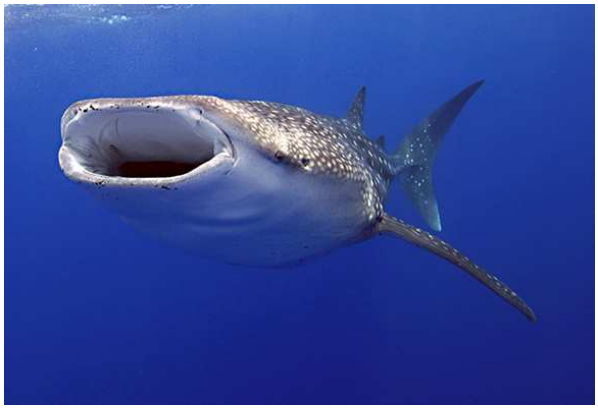
Shark patrol alternative for Indonesian fishers

Researchers say Indonesian fishermen who've been banned from hunting certain species in the waters off Northern Australia could work as sea rangers monitoring vulnerable whale shark populations.

The fishermen are considered a rich source of information about the migratory habits of the whale sharks which travel between Australia and south-east Asia.



Marine researchers told the Coast2Coast conference in Darwin that satellite tagging is already providing important information about the vulnerable animals.

Natasha Stacey is an environmental researcher, and she says there is already a pilot program for coastal villagers in West Timor to become involved in monitoring the shark population.

"They can get paid for that service or be provided with an income that takes them away from pressure on exploiting already overexploited fisheries resources," Ms Stacey said.

Source: ABC Radio Australia