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Government of South Australia

The Marine Reptiles of South Australia

Lepidochelys olivacea, Tunkalilla Beach.
Photo: Elizabeth Steele-Collins.

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MARINE REPTILES IN SOUTH AUSTRALIAN WATERS

CHELONIIDAE, DERMOCHELYIDAE, ELAPIDAE

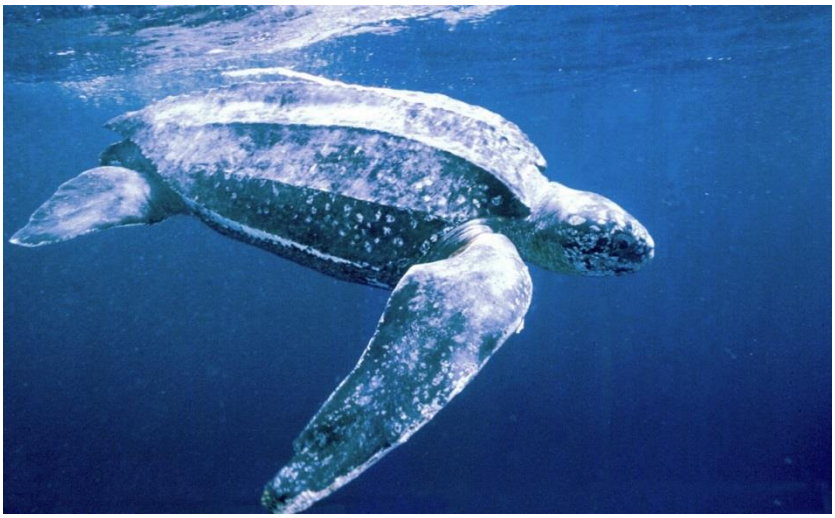
Mark Hutchinson

South Australian coastal waters are cold (for Adelaide, seasonal averages range from 14 – 19 C), and marine reptiles for the most part are tropical. Marine reptiles are typically confined to waters with temperatures around 18 C or higher. If they spend too long at lower temperatures than this most marine reptiles become lethargic, fail to feed or digest properly and eventually die if they cannot make their way to warmer water again. It is a sad result of this temperature limitation that most marine reptiles that are recorded along the South Australian coast are either dead or dying. There is no hard information on the origins of these unlucky individuals, but it seems likely that the south-flowing currents along the eastern and western coasts of Australia can from time to time sweep tropical reptiles southward and around into our waters, a one-way trip once they start to chill.

THE LEATHERBACK - DERMOCHELYIDAE

One sea turtle is an exception to the preceding general information. The largest sea turtle (shell length and flipper span to 2 metres; weight to half a tonne or more), the Leatherback Turtle (*Dermochelys coriacea*), breeds in the tropics like the other marine turtles, but immatures and non-breeding adults disperse very widely and survive well at mid latitudes and colder waters than the rest (down to 12 C)[1]. Leatherbacks can do so because they have several unique adaptations, including swimming muscles that have the same efficiency across a wide range of water temperatures[2], and deposits of a form of fat ("brown fat")[3] that produces heat rather than other forms of metabolic energy. The precise function of this fat is not known but its presence may enable the turtles to generate some body heat to help maintain normal body functions when they are in cooler water. This turtle, the only member of its family (Dermochelyidae), is unlike other turtles in external appearance. The shell is not covered by large regular plates. Instead it is covered by tough, blackish leathery skin which has a mosaic of little bony platelets embedded in it. The skin is raised into a series of five ridges that run lengthwise along the carapace (upper half of the shell), and the back of the shell tapers to a narrow point.

This species is regularly seen in our coastal waters (first record in 1857!), and unfortunately these large surface feeding turtles are sometimes killed in collisions with ships or drown after being fouled by discarded ropes or nets. An additional hazard faced by this species is discarded plastic bags and sheets. Leatherbacks are specialised feeders on jellyfish and salps (colonial floating creatures related to sea squirts). The turtles feed on the surface where these translucent organisms drift, and seem unable to tell the difference between a floating jelly-like animal and floating plastic. If they swallow large pieces of plastic their digestive systems become blocked and they die.



Leatherback Turtle. Photo from amigosdomarnaescola.com, via Colin Limpus.

Remains of Leatherback Turtle washed ashore, fouled in discarded fishing gear, Coorong, 2008

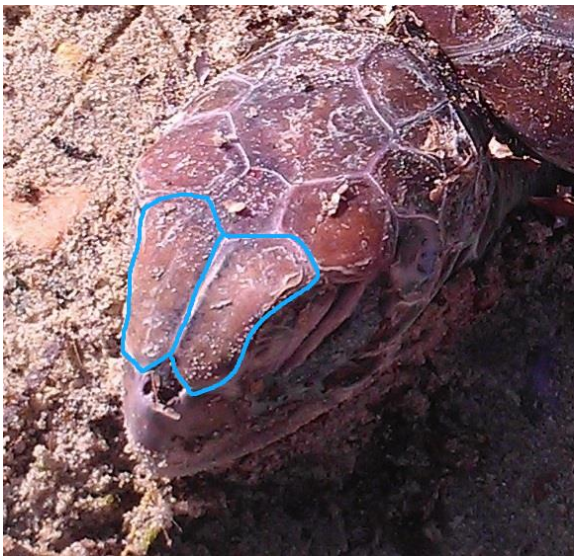
Alone among the species discussed here, the Leatherback Turtle should be regarded as a normal component of the South Australian marine fauna, in the same way that migratory birds that come here in the non-breeding season depend on our land and sea environments. As the Leatherback is regarded as endangered world-wide, accidental deaths in South Australian waters may be a serious matter. Under normal circumstances female leatherbacks are long lived and their lifetime output of eggs is needed to compensate for the fact that the great majority of hatchling leatherbacks are eaten by predators well before they reach maturity. The species' survival depends on the lucky few that make it to adulthood, and so even a small number of deaths of these vital adult females could have a negative effect on the overall reproductive output of this species.

TYPICAL SEA TURTLES - CHELONIIDAE

Sea turtle remains are not uncommon on southern beaches. Their large size and the presence of flippers instead of clawed feet immediately distinguishes these turtles from the local freshwater species. Cheloniid sea turtles have the usual plate-covered turtle shell, unlike the ridged, leathery shell of the previous species. The plates are arranged in definite patterns that can differ between species and are useful for identification. Shells are generally smooth although younger individuals of some species may have a keel or low ridge running down the centre of each of the shell plates on the carapace (the upper shell). All six species in this family are tropical to subtropical in distribution.

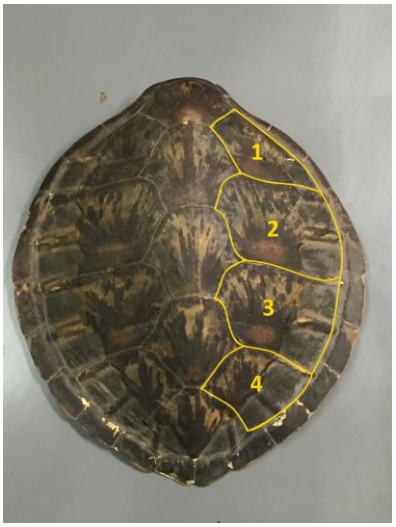
Most SA records are for the two most abundant tropical species in northern Australian waters, the Green Turtle (*Chelonia mydas*) and the Loggerhead Turtle (*Caretta caretta*). Recently there have been the first records for a third species, the Olive Ridley Turtle (*Lepidochelys olivacea*). Two other species known from Australian waters, the Flatback (*Natator depressus*) and the Hawksbill (*Eretmochelys imbricata*), have not yet been recorded as vagrants from South Australia.

The three species recorded so far all have differences in the arrangement of the scaly plates on their shells and their heads that enable them to be identified. The plates down each side of the middle of the carapace (the costal plates, from the Latin word for rib, *costa*) vary from 4 to 6, depending on the species, and the enlarged prefrontal plates may be just a single enlarged pair or subdivided into four or five.

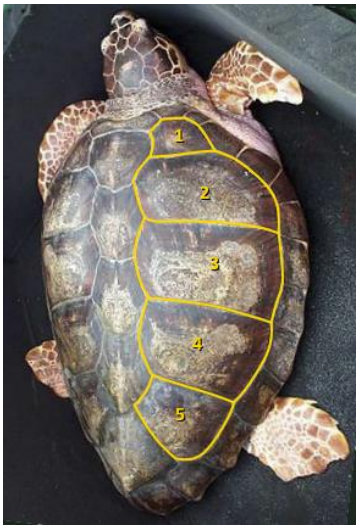


Green turtles (and Flatbacks and Hawksbills – neither recorded in SA) have a single pair of prefrontal plates between the nostrils and the level of the eyes. Sellicks Beach, 2012,

Loggerheads and Pacific Ridleys have two pairs of prefrontals, usually with an additional scale in the middle



Greens (and Flatbacks and Hawksbills) have four costal plates on each side of the carapace (upper shell). Shell to 1.4 m long. Photo: M Hutchinson



Loggerheads have five costal plates (rarely six) and a shell (to 1.2 m) that tapers towards the rear. Photo: marine.bio.org.

Pacific Ridleys are smaller (under 75 cm shell length) and have six (occasionally five or seven) costal plates. Semaphore, 2012. Photo: J. Van Weenen.

SEA SNAKES – ELAPIDAE

Sea snakes belong to the same venomous snake family as Australia's venomous land snakes. In fact all the evidence points to the main sea snake group having evolved relatively recently (within the last 8 million years or so)[4] from Australian ancestors related to the tiger snake and similar live-bearing species.

Occasional sightings are reported of sea snakes from South Australian waters, but these are much rarer than reports of sea turtles, and so far only one species has been confirmed, the elegant sea snake, *Hydrophis elegans*, a common species in northern Australian waters.

At times several local marine eel species are confused with sea snakes. Eel species such as the serpent eel (*Ophisurus serpens*), worm eels (*Scolecenchelys* spp.) and the green moray (*Gymnothorax prasinus*) are similar in general size and proportions to sea snakes. Naturally they do not have to surface to breathe, and close examination will reveal that the serpent eel has small pectoral fins just behind the head, although worm eels and morays lack them. All these eel species have narrow, tapering heads and pointed snouts. A specimen that has been hooked or washed up can be quickly identified as a sea snake by its clearly visible scales; eels lack visible scales; they are either truly scaleless or have tiny scales embedded in the slime coat.

Elegant sea snake, *Hydrophis elegans*, Hanson Bay, Kangaroo Island, 2011. Photo: Deb Davis, DEWNR.

Head of a sea snake (*Aipysurus laevis*); note obvious scales and rounded head and snout

Head of a Green Moray eel; note narrow conical snout, thick neck and lack of obvious scales

Given their family relationships, it should not be surprising that sea snakes can have extremely toxic venoms and a live specimen should be treated with great caution. Exhausted sea snakes lying on the beach may be alive but not moving, so it can be difficult to tell whether one is alive or dead. ***Do not pick up or handle a live sea snake***, no matter how calm it appears.

REPORT YOUR SIGHTINGS

The South Australian Museum is trying to improve our knowledge of the frequency with which marine reptiles are seen, which species are present, and where they come from. If you find a dead, beach-washed turtle or sea snake, or photograph a live one in or under the water, the Herpetology Section of the South Australian Museum would like to record copies

of your photographs, to add to the record of what we know. Contact the Museum's Discovery Centre ([08] 8207 7405; information@samuseum.sa.gov.au) and let us know what you found. A small piece of skin, saved in a zip-lock plastic bag and frozen, even dry and decayed, can still have DNA and this can be used to trace the origin of the individual back to its source population in the north. You could be contributing an important piece to the puzzle that still exists regarding the mostly ill-fated marine reptiles that visit our shores.

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3. Goff, G.P. & Stenson, G.B. 1988. Brown adipose tissue in leatherback sea turtles: a thermogenic organ in an endothermic reptile? *Copeia* 1988: 1071-1075.
4. Sanders, K.L., Lee, M.S.Y., Leys, R, Foster, R. & Keogh, J.S. 2008. Molecular phylogeny and divergence dates for Australasian elapids and sea snakes (Hydrophiinae): evidence from seven genes for rapid evolutionary radiations. *Journal of Evolutionary Biology* 21: 682–695.