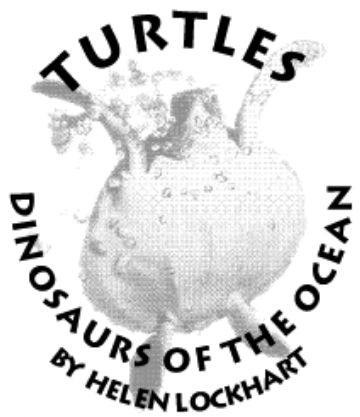

TURTLES - DINOSAURS OF THE OCEANS by Helen Lockhart©

INTRODUCTION & OVERVIEW

Sea turtles are living dinosaurs, having survived some 90 million years from the Age of the Reptiles. Whilst people are fascinated with these ancient creatures because of their link with the distant past and the fact that they have not changed significantly in all these years, turtles are now endangered and threatened with extinction. Recent estimates of the global population of leatherback turtles alone indicate that numbers have fallen by two-thirds since 1980 and continue to plummet (Earthwatch, May/June 1997).

There are seven species of turtles - leatherback (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), olive ridley turtle (*Lepidochelys olivacea*), loggerhead (*Caretta caretta*), flatback (*Chelonia depressa*) and Kemp's ridley turtle (*Lepidochelys kempi*). However, only five species occur in the waters off southern Africa. Loggerheads and leatherbacks nest on the north coast of KwaZulu Natal whilst the green turtle occurs as a non-breeding resident and the hawksbill and olive ridley as strays (Hughes,1989).

Although turtles breath air, using lungs as do mammals and come ashore to lay their eggs which can only develop on land, they are exquisitely adapted to life in the oceans. The carapace (shell) of the turtle is streamlined and the bony elements have been reduced so that the gravity of the carapace is similar to that of the sea. Although they appear clumsy and slow on land, turtles are powerful swimmers, using their flat, broad front flippers to propel them through the water and the smaller back flippers as rudders.

Their sensory organs have evolved to function efficiently underwater. Turtles have good underwater vision, but their eyesight on land is poor. The popular myth that turtles are crying when nesting due to the 'pain is based on the fact that turtles have special glands situated next to the tear ducts. These glands excrete excess salts in solution and whilst this process occurs continuously, it is obviously more noticeable when the turtle is out of the water.
Hearing in turtles is poorly developed and 'the eardrum is covered by ordinary skin which greatly reduces sensitivity' (Bustard, 1972). Turtles can hear low notes the best and are sensitive to vibrations on land and in the water.

Most turtles have a keen sense of smell, and sea turtles are unlikely to be exceptions.
Turtles are air-breathing animals and due to their watery habitat, they need to hold their breath for long periods of time. Thus, they can fully inflate their lungs and draw off as much oxygen as possible. When sleeping or hibernating (on the bottom), they have wonderful adaptations for surviving for hours or even months underwater.

Unlike many lizards and snakes which bear live young, turtles like crocodiles, lay eggs. Mating occurs at sea, usually near the surface, and fertilisation occurs internally. Females come ashore to lay great numbers of eggs in specially dug out 'nests' high up on the beach.

Turtles are defenseless animals, having only their shell to protect them. Unlike tortoises, turtles cannot completely withdraw their heads and limbs into their shells. In the oceans, it is only their

large size which offer them some protection from predators. Sharks and whales have been known to prey on turtles. The turtle's greatest enemy is man who destroys their nesting sites, plunders nests for eggs, kills them for food and in the case of hawksbills, for their tortoise-shells.

TURTLES IN SOUTH AFRICA

As mentioned previously, only loggerheads and leatherbacks nest on the South African coast, although green turtles are very common offshore.

Green turtles are so named because the fat layer underneath the carapace is green! They have a short snout and their beak is not hooked as in the loggerhead turtle. Adult green turtles feed mainly on seaweed and seagrass and thus can often be seen close inshore, basking at the surface. Female green turtles lay up to 150 eggs every 12 days or so, totalling approximately 600 eggs per season. Nesting occurs on the islands off Mozambique and other Indian Ocean islands. On some of these islands, the green turtles have been hunted almost to extinction. The larger of the two turtles in the I&J Predator Exhibit in the Aquarium is a green turtle.

The loggerhead turtle, which is the most common in southern Africa, has a reddish-brown carapace and a hooked beak. Adults gain a maximum mass of 125 kilograms and measure up to 1,2 m in length. Loggerheads feed predominantly on sea urchins, molluscs and hermit crabs which they crush with their powerful jaws. Females nest on the northern beaches of KwaZulu-Natal and lay 100 - 120 eggs every 15 days during summer.
The smaller turtle in the I&J Predator Exhibit is a loggerhead turtle.

Leatherbacks can be distinguished from all other species purely by their great size - they can measure up to 2,5 m in length and weigh up to a staggering 1,0 tonnes. These turtles are the second largest living reptiles! Considering the huge size which they attain, it is remarkable that these animals feed almost exclusively on jellyfish. During a nesting season, females lay up to 1000 billiard-ball size eggs in batches of 100 - 120 every 9-10 days.

THE NESTING SEASON

The nesting season for loggerheads and leatherbacks takes place along the sandy beaches of northern KwaZulu Natal from October to February, coinciding with the presence of warm oceanic water (Hughes, 1989).

Males and females gather off the coast in September and October and mating occurs offshore in the water. Male turtles have specially adapted long, curved claws on their foreflippers, which they use to grasp the front of the female's carapace (Hughes, 1989). It is whilst mating that males are particularly vulnerable and easily harpooned by man.

Females come ashore after dark, most often using the high tides to facilitate their clumsy movements on land. Remarkably, female turtles tend to return to the same beach every season to lay their eggs. It seems that each beach has its own scent and females use this scent to orient themselves. Once ashore, the female turtle briefly surveys the beach for any threatening movements, etc. The slightest disturbance, such as torchlight or people coming too close to her, will send her straight back into the sea.

Loggerhead females tend to make small nests in the dunes while leatherbacks dig huge nests of approximately 10m square just above the high watermark. This renders the nests vulnerable to intrusive beach traffic. To build the nest, the female turtle uses her front flippers and, with great sweeping motions, creates a large hole into which she steadily digs herself. Then using her

smaller hind flippers, she meticulously scoops out a nest chamber of approximately 40-cm deep, patting down the sides to prevent them from caving in. Having completed the chamber, she then lays hundreds of white, soft-shelled eggs, the size depending on the particular species. Once the eggs are laid she carefully deposits sand into the chamber with her hindflippers, leaving a small space between the top of the eggs and the surface of the beach (Hughes, 1989). Then using her front flippers, she vigorously sweeps sand over the chamber to disguise the site.

The eggs incubate for a period of 55 -60 days, usually hatching between January and March. An interesting phenomenon is that the sex of the hatchlings is determined by the temperature of the clutch during the first 3 to 4 weeks of incubation. If the clutch is between 20-24 º C, the hatchlings will most likely all be males. If the clutch is laid at temperatures of 29 º C and higher, the hatchlings will be predominantly females.

The entire batch of eggs hatches at the same time, with each hatchling using an eggtooth on the top of the beak to break out of the egg. After a brief period of waiting for their shells to straighten out and harden, the baby turtles begin to make their way to the surface. This can take 3-4 days. The hatchlings remain just under the surface of the sand until the beach temperature drops below 26 º C and then they emerge, usually at twilight. The hatchlings rarely emerge during the day as the threat of predation by birds and the hot sand would kill them immediately.
Using a light source such as the horizon or the moon, the hatchlings head for the sea. This journey is a dangerous one as they are exposed and are vulnerable to predation by crabs and other nocturnal animals. In some countries around the world where illuminated roads and promenades run parallel to the beach, the baby turtles head blindly for this light source and are killed by passing cars.
Once in the water, the hatchlings swim through the breakers and out into the warm Agulhas Current.
A low percentage of hatchlings will survive to maturity, approximately only 1 in 1000. The young animals will spend months in the Agulhas Current and several years in the great gyres of the Indian Ocean, returning to the coast of Africa as sub-adults.

THREATS TO SEA TURTLES

All seven species of turtles are threatened with extinction. This is largely due to various human activities. One of the major reasons for this status is the continuing loss of nesting habitats. Increased human presence on beaches, particularly at night, disrupts nesting females. They may be forced to use less suitable sites or abort egg laying completely. Recreational activities on beaches along with umbrellas, deck chairs, small boats and 4x4 vehicles, damage potential nesting sites and even destroy existing nests.

Poaching ranks as another major threat. Nests are raided for the eggs which provide food for the local people.

The ingestion of litter, particularly plastic, has serious and lethal consequences for turtles. Leatherbacks mistake plastic bags for jellyfish. Plastic is not only toxic, but also obstructs the stomach and prevents the turtle from receiving nutrition from its food. The result is a lingering death.

Other threats include artificial lighting from buildings, street lights, etc. which disorient hatchlings; building of sea walls, jetties etc.; beach erosion; beach cleaning; commercial fishing (turtles are accidentally caught up in gill nets) and oil and gas exploration.

Hatchlings are particularly vulnerable to Nature's predators as they make their way from the nest to the sea. Gulls, mongoose, leguaans, crabs, and even ants attack the baby turtles. Once in the sea, large fishes also prey on them.

CONSERVATION AND PROTECTION OF TURTLES IN SA

South Africa is one of the forerunners in turtle protection and conservation. The first law prohibiting the killing of turtles was issued in KwaZulu Natal in 1916. Further laws were instituted in 1947, but it was only in 1963 that the Natal Parks Board, now known as the KwaZulu Natal Conservation Service, began a concerted turtle protection programme. Most nesting areas along South Africa's north east coast have been declared protected areas or marine reserves. These include the St Lucia Marine Reserve and the Maputaland Marine Reserve. The nesting populations of loggerheads and leatherbacks are monitored annually (Hughes, 1989). Local communities have been enlisted to patrol the reserves, both on foot and in vehicles. As a result of this job creation, poaching has declined significantly.

The threat of a harbour development at Kosi Bay in recent years caused great concern as this area falls in the middle of the nesting grounds. As a result, the Parks Board began a translocation programme and relocated some 200,000 eggs to the St Lucia Marine Reserve between the 1982 and 1992 breeding seasons.

As a result of these and other efforts, there has been a steady increase in the numbers of breeding turtles, with a record nesting season for loggerheads being achieved this year. Some 525 individual females were recorded nesting this past season.

Ecotourism Tours

The honour of witnessing the ancient rite of nesting females turtles is to be treasured. Every year from November at Sodwana Bay, those fortunate enough can join patrolling officers of the KwaZulu Natal Conservation Service and witness female turtles nesting at night. Private sector operators also take tours, either by vehicle or by foot from Cape Vidal, Rocktail Bay and Bhanga Nek.

AN EARTHWATCH SUCCESS STORY

Since 1991, every night during every nesting season, Earthwatch volunteers have watched over the nesting grounds of the leatherback turtle on Playa Grande in Costa Rica. In 1988, only ONE leatherback hatchling was seen to come off the beach, but by 1997, some 125, 000 hatchlings came off the very same beach. Former poachers are now proud tourist guides, having attended a two-week training course. As a result of the Earthwatch project, Playa Grande and two nearby beaches were declared as part of a new National Park, Parque Marino Las Baulas or Leatherback Turtle Marine Park, in July 1995.

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