



# An Introduction to the Sea Turtles of the World



## Getting to know the turtles

### Turtles: from the land to the sea

Turtles are one of the most primitive groups of vertebrates in existence and are found on every continent except Antarctica. The most ancient turtle fossil dates from the Triassic period, nearly 230 million years ago. There are an estimated 245 turtle species, distributed in 87 genera and 12 families. They inhabit freshwater ecosystems (lakes, rivers, and swamps) as well as other terrestrial and marine environments. Turtles have adapted very specific characteristics depending on the habitat in which they live.

### Sea turtles: prehistoric creatures

Sea turtles have inhabited the Earth for over 100 million years, evolving from the freshwater turtles. They are easily distinguished by the presence of flippers, paddle-like forelimbs that unite their elongated digits, helping them to adapt to their predominately marine life. These powerful flippers, along with a more streamlined shell, enable them to become fast swimmers and carry out extensive migrations. Sea turtles have also lost the ability to retract their extremities (head, flippers or tail) into their shell. Throughout their ancient history, sea turtles have survived drastic changes in the environment, including those that caused the disappearance of the dinosaurs. Nonetheless, their present survival is now more than ever in danger.



### General sea turtle characteristics



Turtles, along with lizards, snakes and crocodiles belong to the class Reptilia. They are vertebrates and are easily recognized by their shell, which protects their internal organs. The shell is made up of two parts, the upper half called the carapace, and the lower part known as the plastron. The leatherback turtle (*Dermochelys coriacea*) is distinguished by their soft carapace, similar to a thick, leathery coat of skin. Sea turtles have a modified jaw but, lack teeth. They have primitive hearing, an excellent sense of smell

and their vision is good underwater. There are one or two claws present on each of their long front flippers, with the exception of the leatherback turtle that lacks claws. The female's tails are shorter than the males, which house the male reproductive organ and help in the mating process.

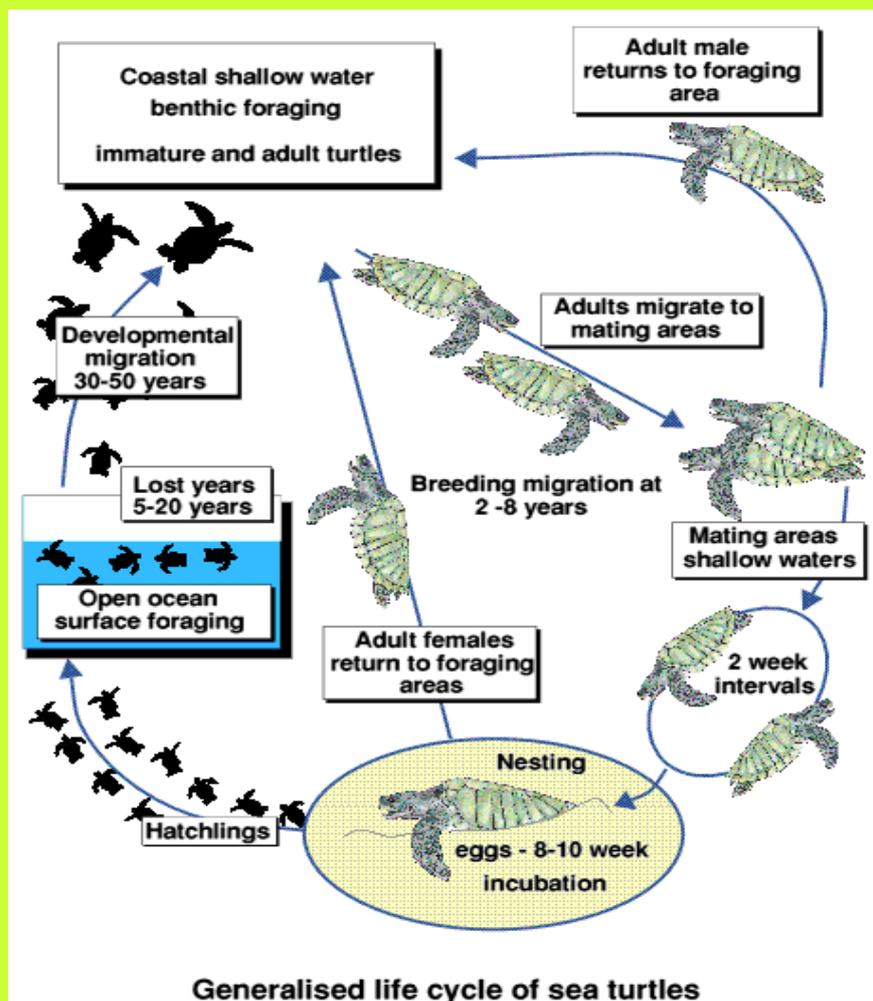
Sea turtles are cold blooded animals; therefore, they are unable to maintain a constant body temperature and must use the sun to regulate their temperature. Only the leatherback turtle is capable of regulating their body temperature by using changes in the blood flow to the skin and periphery. This allows them to travel to cold waters in



search of food. Also, the leatherback's great layer of adipose (fatty) tissue acts as an effective thermal insulator preventing excess loss of accumulated heat. Sea turtles use lungs to breathe air and therefore need to emerge periodically. They are capable of diving to great depths, especially the leatherback, with a maximum recorded depth of 1300 meters (Eckert 1989). Sea turtles have a slow metabolic rate that allows them to conserve oxygen and stay immersed for extended periods of time.

## Life cycle of a sea turtle

It is believed that a sea turtle spends its first few years drifting in the open ocean; however, juveniles and adults are known to congregate in foraging (feeding) and mating areas, as well as at nesting grounds. Generally, sea turtles spend the majority of their life at sea, although females must occasionally emerge to lay their eggs on the beach. It is said that the males also come ashore to bask or possibly evade predators, although there is no scientific certainty as to why (Spotila, J.R. et.al. 1997).



(Source: Euro Turtle [www.euroturtle.org](http://www.euroturtle.org) and MEDASSET-Mediterranean Association to Save the Sea Turtles [www.medasset.org](http://www.medasset.org) )

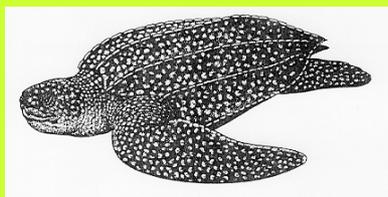
All sea turtles reproduce by way of internal fertilization. After mating, the females migrate toward their respective nesting beaches, generally the same beach where they emerged as hatchlings. Turtles may recognize their natal beaches by chemical imprinting during the hatchling's journey from the nest to the sea, or other unknown mechanisms. When the females are ready to nest, they emerge on tropical, subtropical or temperate beaches, generally at night. Using their flippers, they prepare their nesting site by excavating a body pit to accommodate themselves in the sand. Later, they use their hind flippers to dig an egg chamber, where they will lay between 50 and 200 eggs per nest, depending on the species. Once the turtle has finished laying her eggs, she fills in the nest chamber with sand. With the possible exception of the kemp's ridley, female sea turtles do not reproduce every year; they usually take between two to four years to return to nest. The eggs will take between 45 and 75 days to hatch. The sex of the hatchling is determined by the temperature of the sand. In general, warmer temperatures produce females and cooler temperatures produce males. It is believed that approximately one out of every 1,000 hatchlings that emerge will survive to maturity. Hatchlings usually emerge from the nest during the early evening or morning hours, immediately crawling seaward and disappearing offshore where they begin swimming towards the open ocean and take refuge in circular current systems. They are not seen again until they have grown to be much larger juveniles. This largely unknown stage of sea turtle life history is called the "lost years". Sea turtles reach sexual maturity between 10 and 50 years of age, although this varies among species. There is no way to determine the age of a sea turtle by physical appearance; however, it is thought that some species may live to be more than 100 years old.



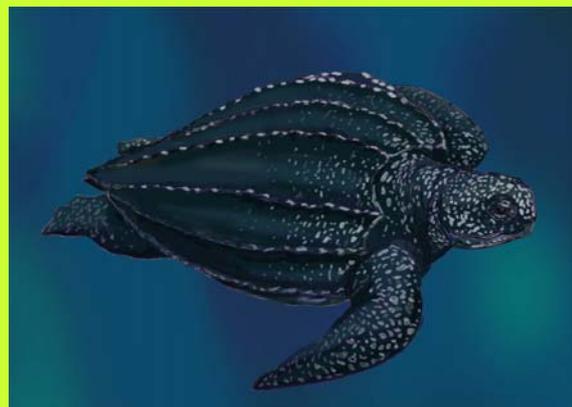
## Sea turtle species of the world

By the Cretaceous, four marine turtle families - the Toxochelyidae, Protostegidae, Cheloniidae and Dermochelyidae – were all established, the last two surviving to the present. The scientists currently recognize seven remaining sea turtle species within these last two families.

**Dermochelyidae:** the shell of these turtles lack scutes and is composed of a thin layer of tough, rubbery skin, similar to leather. Scales are present only in the first few weeks of life. Today, this family is represented by a single species.



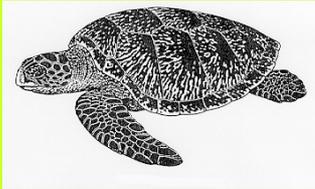
Leatherback  
(*Dermochelys coriacea*)



The leatherback is the world's largest sea turtle, reaching up to 8 feet in length and weighing roughly 1000 lbs. Their diet consists primarily of jellyfish. The color of their carapace is typically black with many

white spots. This species has the widest distribution of any sea turtle; it is found in temperate and tropical oceans as well as very cold sub-arctic waters. Some of the most important leatherback populations have shown up to a 90% decline over the last decade (Chacón and Aráuz 2001). Harvesting of eggs on nesting beaches and adult mortality caused by the incidental capture in fisheries are principle causes for this decline. **Currently, they are listed as critically endangered by the World Conservation Union (IUCN).**

**Cheloniidae:** The shells of these turtles have scutes, scales are evident, and there are six species representing this family.

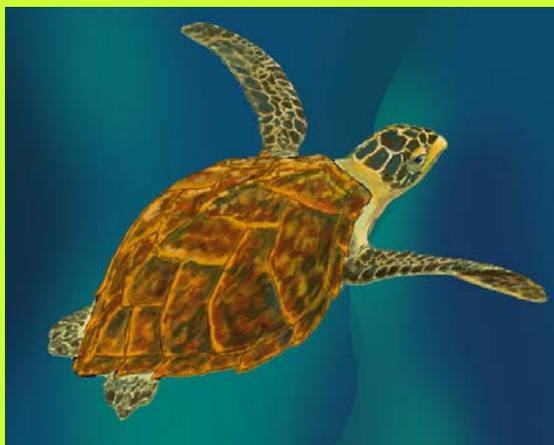


**Green Turtle**  
(*Chelonia mydas*)

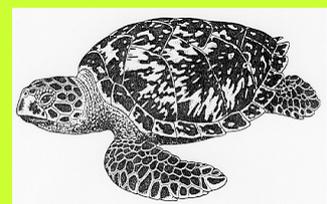
Adult green turtles measure up to 5 feet in length and can weigh over 500 lbs. They eat mostly seagrasses and algae, the only herbivorous sea turtle. This type of diet produces a green color of fat under the shell, thus giving the sea turtle its name. Green turtles are found in all temperate and tropical waters of the world, and less frequently in subtropical zones. The largest nesting site in the Western Hemisphere is at Tortuguero, Costa Rica, which has reported a positive trend in the population growth despite the continued consumption of their meat and illegal harvesting of eggs along the Caribbean. It is estimated that at least 11,000 green turtles are consumed annually (Chacón 2002).



**Currently, the species is listed as endangered by the IUCN.** A distinct variety of the green turtle, known as the black sea turtle, is found in the eastern Pacific. This species is smaller, measuring between 2 and 3 feet in length and weighing around 250 lbs. This species is also herbivorous. The principle nesting grounds are found in Mexico and Galápagos Islands. The illegal capture of the turtles for their meat and the harvesting of their eggs continue to be principle threats to their survival. Their populations have drastically reduced over the last 30 years (Chacón 2002).



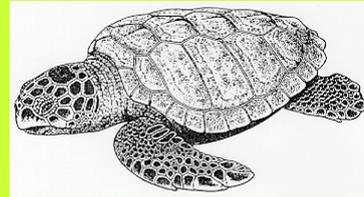
**Hawksbill**  
(*Eretmochelys imbricata*)



Adult hawksbills measure between 2 and 3 feet in length and weigh approximately 130 lbs. Their carapace is dark brown, orange or yellow in color and easily distinguished by their overlapping scutes. They are the most tropical of all sea turtles and found throughout the Atlantic, Pacific and Indian Oceans, inhabiting coastal reefs and feeding on sponges, sea urchins, anemones and squid. Their jaw is

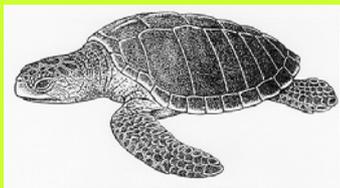
shaped like a beak, permitting it to reach food located in the crevices of rocks and corals. The hawksbill continues to be captured for its prized shell, used in making jewelry, eye glass frames, bracelets and spurs, and many other items. Furthermore, hatchlings and juveniles are dried and stuffed to be used as adornments, the male reproductive organ is believed to be an aphrodisiac and the consumption of their meat and eggs are considered a delicacy. **This species is currently considered critically endangered by the IUCN.**

**Loggerhead**  
*(Caretta caretta)*



Adult loggerheads measure up to 3 ½ feet in length and can weigh up to 400 lbs. It is named for its exceptionally large head and strong jaws. They are primarily carnivorous and feed on crabs, clams, mussels and other marine invertebrates. Their distribution ranges from the temperate to subtropical waters of the Pacific, Indian and Atlantic Oceans as well as nesting in diverse areas of the Mediterranean Sea; however, the loggerhead prefers nesting in subtropical zones. Important nesting sites are found along the east coast of the United States and very few are found nesting along

the coast of Central America. **Currently, this species is listed as endangered by the IUCN.**



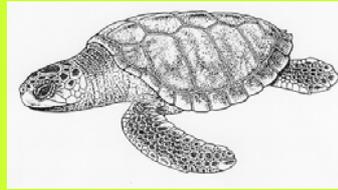
**Olive Ridley**  
*(Lepidochelys olivacea)*

The olive ridley measures between 1 ½ and 2 feet in length and weighs between 75 and 100 lbs. Its diet consists of small fish and crustaceans. This species nests in mass synchronized nesting, also known as “arribadas”. During these events, between 100,000 and 300,000 females emerge from the sea to lay their eggs on the same beach. Along the Pacific coast of Central America there are many beaches where this phenomena occurs, such as Ostional and Nancite (Costa Rica), La Flor and Chacocente beaches (Nicaragua), and Islas Cañas and Marinera (Panamá) (Chacón 2002). The olive ridley eggs are considered to be aphrodisiacs, therefore, in some coastal towns their consumption is ingrained in their diet. Solitary nesting of this species occurs from Guatemala to Panama. Although they are considered the most numerous species of sea turtle in the



eastern Pacific, **they are still listed as endangered on the IUCN Red List** due to their high mortality rate from incidental capture by fisheries as well as heavy egg collection.

**Kemp's Ridley**  
*(Lepidochelys kempi)*



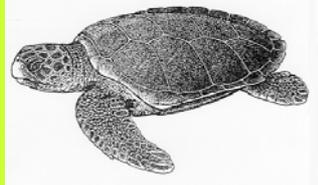
Similar to the *L. olivacea*, the kemp's ridley nests in "arribadas". They reach a length of 2 feet and weight between 75 and 100 lbs. This species feeds primarily on crustaceans (mainly crabs). Due to the fact that they are found exclusively in the Gulf of Mexico and in the tropical waters of the Atlantic, this species is considered the rarest sea turtle in the world and is **listed as critically endangered by the IUCN**. The *L. olivacea* and the kemp's ridley are the smallest of all species of sea turtles.



Thanks to conservation programs at nesting beaches and the application of TEDs (turtle excluder devices) in shrimp fisheries, which are used to help prevent the capture of sea turtles and reduce their mortality, the kemp's ridley has shown a population increase over the last decade.

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**Flatback (*Natator depressus*)**



This species is confined to the waters of a single nation - Australia. It reaches almost 3 feet in length and weighs approximately 200 lbs. It is carnivorous and feeds on sea urchins

and jellyfish. The flatback is named due to its very flat shell. Different to the rest of the turtles, this species is not highly migratory and completes all of its life cycle within zones close to their nesting beaches. According to the IUCN Red List, there is inadequate data to determine the actual situation of this species.



**Oceanic travelers and visitors of our coasts**



Sea turtles have the widest distribution of any reptiles. They inhabit the tropical and subtropical seas throughout the world. Some species are even found in the temperate or sub-arctic zones, carrying out important functions within a diversity of ecosystems.

Sea turtles carry out extensive migrations of thousands of kilometers across the oceans, from their foraging areas to their mating areas, and finally to their nesting grounds. In order to carry out these transoceanic journeys, it is believed that

they use different methods of orientation, among them: the detection of geomagnetic fields, chemical cues carried by ocean currents, and the direction of certain marine currents. The leatherback turtle is known for the longest migration, with a recorded distance of almost 6000 kilometers (Eckert, K.L. et.al. 1988). Satellite transmitters, which are attached to the back of the turtle's carapace, are used to learn more about the turtle's behavior during these transoceanic journeys. By means of a small antenna, signals are emitted each time the turtle surfaces for air. These signals provide important information to scientist about the turtle's migration route and geographic location throughout the nesting season. This information will help to improve the protection offered to sea turtles when migrating away from nesting areas.

### Threats to sea turtle survival

During the first stages of their life, sea turtles experience a high mortality rate due to both natural and anthropogenic causes. During incubation, the eggs are predated on by wild and domestic animals such as: crabs, raccoons, dogs and pigs. After hatchlings leave the nest, they fall easy prey to crabs, birds and fish, among other animals. During their juvenile and adult stages, the number of potential predators goes down as they get larger; however, they may occasionally be attacked by sharks. Environmental factors, such as climate change, hurricanes and beach erosion, negatively impact the hatching of sea turtles. Even so, impacts from human activities prove to be the greatest threats to the survival of the sea turtles. Turtles are captured at sea for their meat, falling victim to both commercial and artisanal fisheries, as well as for the commercialization of their eggs and shell. Every year thousands of turtles are killed when incidentally captured by long line, gill nets, and various types of fishing gear. Another significant threat to the turtles is chronic pollution from industrial and agricultural wastes as well as urban runoff. At sea, the turtles ingest plastic bags and other debris that may be confused for their prey, such as jellyfish. Furthermore, physical barriers and construction along the beach may reduce the amount of nesting beach available to the sea turtles as well as generate artificial lighting. Tourism may disturb nesting females and emergent hatchlings on nesting beaches where no appropriate training is offered to guides that provides them with the knowledge of what care should be taken when finding and approaching a turtle.



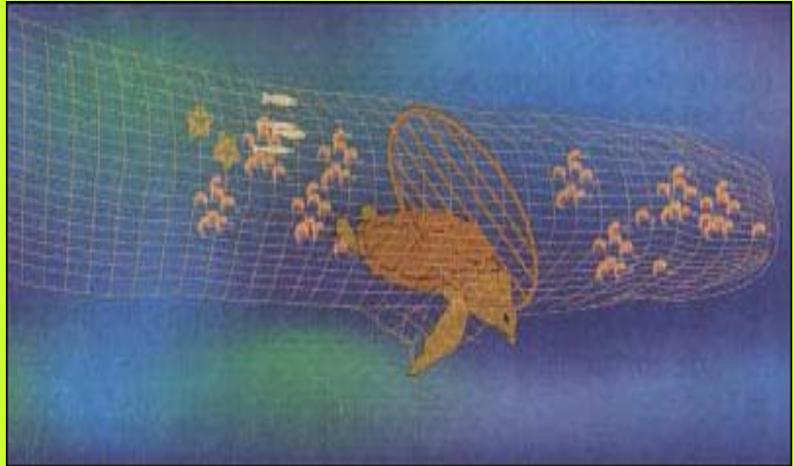
### What is the current outlook for sea turtles?



**All sea turtles of the American Continent are currently considered Endangered or Critically Endangered** according to the IUCN's Red List. Many governmental and non-governmental (NGO) entities are working towards the protection of sea turtles and their habitat. Moreover, numerous agreements related to the protection of sea turtles, such as the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), which prohibits international trade of all products derived from the sea turtles. The Inter-American Convention for the Protection and Conservation of Sea Turtles entered into force in May of 2001. Currently, there are eleven nations of the

American Continent that form part of this Convention; the area of application comprises the entire continent, including the land territory as well as the maritime areas. Its objective is to promote the protection, conservation and recovery of the sea turtle populations and the habitats on which they depend by implementing harmonious measures between nations.

Advances in fishing techniques are currently being developed to help minimize incidental take, from TEDs in shrimp trawlers to the creation of new hooks for long line fisheries. There are many laws that offer protection to sea turtles as well as proposed management plans to integrate surrounding communities into the protection and research of these species, offering economic benefits from the creation of new jobs.



Although many efforts toward the protection and conservation of sea turtles and their habitat are recognized, they continue to be threatened with extinction, indicating that there is much work to be done in order to ensure their survival. The future of the sea turtles is in the hands of each one of us.

## References:

- Chacón, D. and Aráuz, R. 2001. Diagnóstico Regional y planificación estratégica para la conservación de las Tortugas Marinas en Centroamérica. Red Regional para la Conservación de las Tortugas Marinas en Centroamérica. 134p.
- Chacón, D., Valerín, N. and Cajiao M<sup>a</sup> Virginia. 2001. Manual para mejores prácticas de conservación de las tortugas marinas en Centroamérica. 139p.
- Chacón, D. 2002. Diagnóstico sobre el comercio de las tortugas marinas y sus derivados en el istmo Centroamericano. Red Regional para la Conservación de las Tortugas Marinas en Centroamérica (RCA). San José, Costa Rica. 247p.
- Eckert, S.A., Eckert K.A., Ponganis, P., and Kooyman, G.L. 1989. Diving and foraging behaviour of leatherback sea turtles *Dermochelys coriacea*, *Can. J. Zool.*, 67, p.2834-2840.
- Eckert, K.L and Eckert, S.A. 1987. Pre-reproductive movements of leatherback sea turtles (*Dermochelys coriacea*) nesting in the Caribbean, *Copeia*, (2), p. 400-406.
- Las Tortugas Marinas y Nuestro Tiempo:  
<http://omega.ilce.edu.mx:3000/sites/ciencia/volumen3/ciencia3/144/htm/tortuga.htm>
- Spotila, J.R., M.P. O'Connor and Paladino, F.V. 1997. Thermal Biology, in *The Biology of Sea Turtles*, Eds: P.L. Lutz and J.A. Musick.



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Turtle life cycle – Euro Turtle and MEDASSET

Turtle Excluder Device (TED) - PRETOMA



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