

# Loggerhead Sea Turtle

*Caretta caretta*



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## Picture

English - Loggerhead turtle

French - Tortue caouanne

Spanish - Caguama

Massimo Demma/ICRAM



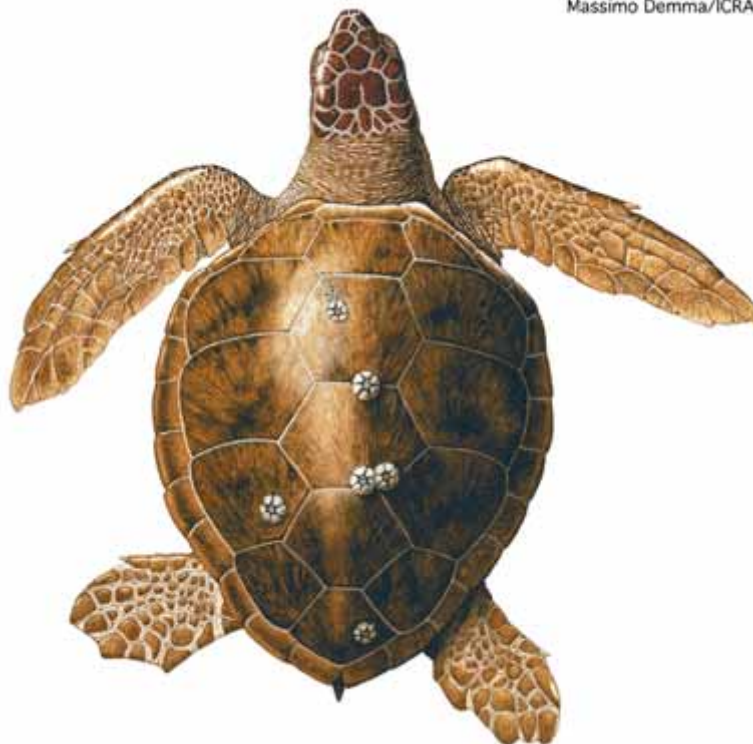
**Loggerhead sea turtle hatchling**

illustration: M. Demma © ICRAM



**Adult loggerhead sea turtle head**

illustration: M. Demma © ICRAM



**Adult loggerhead sea turtle**

illustration: M. Demma © ICRAM

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## Size and Body Mass

### Size (cm) and body mass (kg):

n.b. All figures are FAO (Food & Agriculture Organisation), unless otherwise stated. Figures for females were assumed to be obtained during nesting.

Normal variation in Straight Carapace Length (SCL) for a mature female:

81.5-105.3 cm; n=3502 ( n=number in sample)

The SCL for mature females is always over 70 cm.

World variation: figures, unless stated, are for mature females

USA (South Carolina) 84.5-103 cm: mean 92.7 cm: n=18

USA (Georgia) mean 95.9 cm: n=110

USA (Florida) 74.9-109.2 cm: mean 92 cm: n=661

USA (Broward county) mean 99.6 cm: n=1203

Mexico (Quintana) 73-109cm: mean 90.5 cm: n=423 (females)

Mexico (Quintana) 75.3-99.5 cm: mean 86.5 cm: n=39 (males)

Colombia (Buritaca) 70-102 cm: mean 87.9cm: n=77

Greece (Zakynthos) 70-93 cm:mean 81.5 cm: n=95

Greece (Kiparissa) mean 78.6 cm: 69-91 cm: n=68 (Margaritoulis, 1987)

Greece (SE Cephalonia) mean 76.6 cm: n=25 (Whitmore, C., pers. comm via Groombridge)

Turkey (Dalyan) 55-74.6 cm (Geldiay et al., 1982) - males and females caught at sea

Spain (Balearics) 30-65 cm: n.b. caught on longlines at sea (Mayol & Castello Mas, 1983)

South Africa (Tongaland) 72.8-98.5 cm: mean 86.4 cm: n=1182

South Africa (Natal) 75.2-90.5 cm: mean 81.6 cm: n=13

Oman (Masirah islands) mean 91.2 cm : n=1378

Australia (Heron islands) 86-102 cm: n=?

Japan (Shikoku) 72-107.5 cm: mean 89 cm: n=118

Overall body mass in Kg:

65.7-101.4 kg: mean 75 kg: n=153

### World variation:

Mexico (Quintana Roo) mean 65.7 kg: n=115 (females)

Mexico (Quintana Roo) mean 101.4 kg: n=38 (males)

Mediterranean (all) mean 105 kg: n=? (females)

Greece (SE Cephalonia) mean 68 kg: 52-84 kg: n=12 (Whitmore, C., pers. comm via Groombridge)

South Africa (Tongaland) mean 106.9 kg: n=31 (females)

South Africa (Tongaland) mean 68 kg: n=13 (males)

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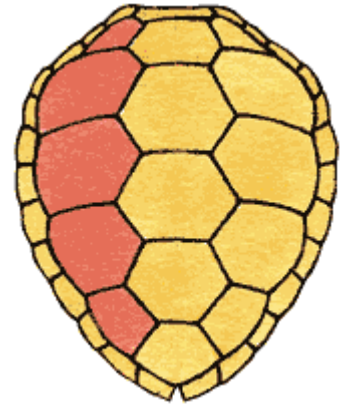
*Caretta caretta*



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## Diagnostic Features

- Heart shaped carapace, its width about 80% of its length.
- Head is large and broad and takes up 25% of carapace length.
- Strong horny beak, thicker than other sea turtles.
- Carapace scutes are thin but very hard and rough, often covered in barnacles.
- Five central plates or scutes.
- Fore flippers quite short and thick, each with 2 claws.
- Rear flippers have 2 or 3 claws.
- Hatchlings and juveniles have 3 keels down carapace length formed from blunt spines
- Colour:
  - Adults are generally evenly covered on the top (dorsal) side.
  - Top colour is reddish brown with dark streaks in South African turtles.
  - Orange-cream on their flanks
  - Orange-cream on underside
  - Hatchlings are dark-brown on top with pale brown margins to flippers and underside



Loggerhead sea turtle carapace  
illustration: M. Demma  
© ICRAM

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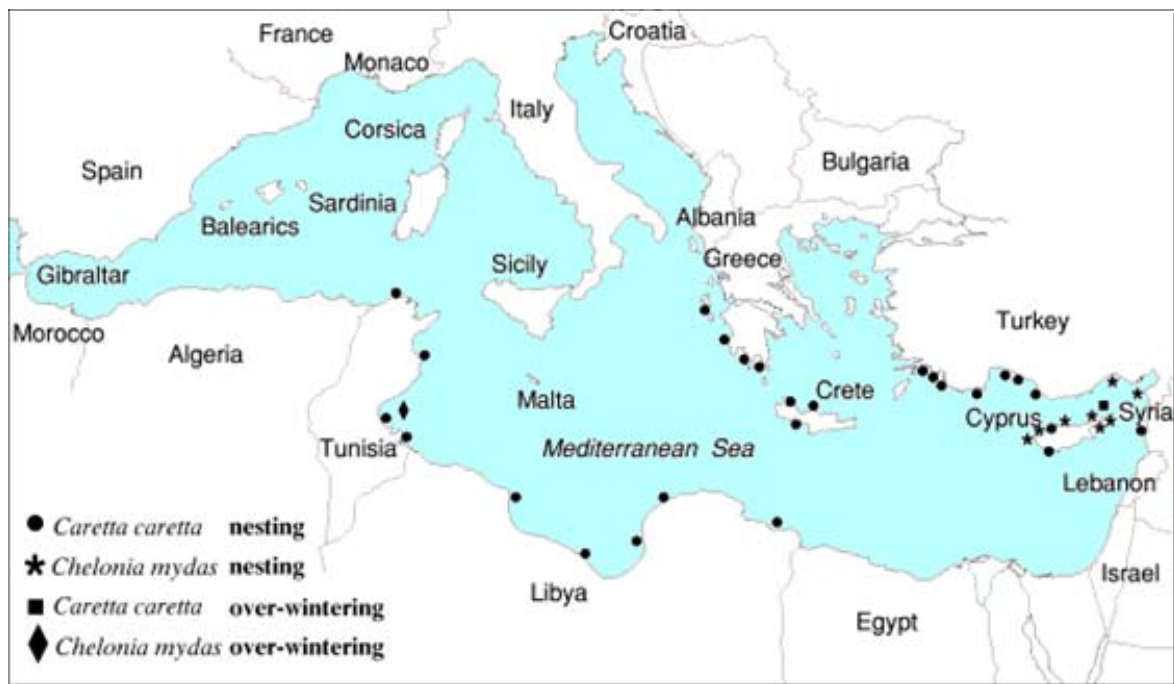
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## Geographical Distribution

- Widely distributed in coastal tropical and subtropical waters (16-20 degrees C).
- Loggerheads can wander into temperate waters to the edge of warm currents.
- Some can migrate long distances in warm currents - Gulf Stream in the Northern Atlantic.
- They can survive in a variety of different environments e.g. Brackish water of coastal lagoons and river mouths; open sea.
- Often get spring-summer feeding grounds for juveniles, sub-adults and some adults.
- In the winter, they can remain buried in the mud of quite deep water.
- Limit of distribution is temperature dependent.
- Rarely survives in water below 10 degrees C.
- In cold waters they become stunned and drift helplessly.
- In some warm years they can get into northern waters e.g. Murmansk and Barent Sea.



*Distribution map courtesy of MEDASSET*

### • References used in distribution maps and population estimations.

- Agardy, T., Last Voyage of the Ancient Mariner p30-37, BBC Wildlife December 1992,
- Bjorndal, Karen A. (Editor), Biology and Conservation of Sea Turtles - (Smithsonian) 1995. (ISBN 1-56098-619-0)
- The FAO Species , Catalogue Vol.11. Sea Turtles of the World, 1990. (ISBN 92-5-102891-5)
- Lutz , P. L. and Musick, J. A., The Biology of Sea Turtles - (Marine Science Series )1996. (ISBN 0-8493-8422-2)
- National Research Council, Decline of the Sea Turtles , 1990. (ISBN 1-900455-005)Proceedings of the 15th Annual Symposium on Sea Turtle Biology and Conservation, 1995.
- Proceedings of the 18th Annual Symposium on Sea Turtle Biology and Conservation, 1998.
- Ripples, Jeff Sea Turtles: (World Life Library) 1996. (ISBN 0-309-04247-X)

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## Habitat and Biology



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### Typical habitats:

Mainly found on the continental shores of warm, shallow seas. Also found around some islands such as Zakynthos in Greece. Most aggregate just off nesting beaches prior to the nesting season (the time varies greatly depending on location). Loggerheads are the only Sea Turtles that can nest successfully outside of the tropics although the water temperature has to be above 20 °C.

### Migrations:

- After nesting, adults disperse to feeding grounds. Outside of the Mediterranean, migratory routes are not clearly defined although hatchlings are thought to follow the warm currents such as the Gulf Stream. Hatchlings and juveniles often congregate at sea fronts (the meeting of oceanic currents) where food and floating animals gather. It has been suggested that they get trapped in these currents and only emerge back on their natal beaches once the circuit has been completed - mature and ready to breed!
- Loggerheads can migrate across large distances: one that had nested and been tagged on a beach in Florida was recaptured less than 10 months later, 2,400 km away in the Dominican Republic!
- The time elapsed (a year or more) that the hatchlings stay feeding in these areas are called the *Lost years*. They are thought to drift within the large mats of sargassum weed.
- Mediterranean loggerheads rarely leave their enclosed sea and are thought to be a genetically isolated population. There is some evidence of recruitment via Gibraltar and Suez, although this is probably very small. Loggerheads are found all over the Mediterranean although most activity occurs in the Eastern part of the basin and there is firm evidence that there are important wintering areas located off the south east coast of Turkey (Groombridge).

### Nesting areas:

- Outside of the Mediterranean, there are several major nesting grounds. The major part of the world's nesting sites are located in Southeastern USA with annual nest counts of 28,000 and Oman with 30,000. Elsewhere, there are 2,000 nests in Brazil, 1,000 in South Africa and 2,000 in Australia: smaller nesting sites also exist in numerous other locations. Nests in the Indian Ocean are virtually unknown.
- In the Mediterranean, the loggerhead is the most common nesting turtle, with Greece hosting the highest nesting populations of more than 2,000 individuals. Sekania beach on Zakynthos Island (Greece) has the highest density of nests anywhere in the world. Recent surveys have also shown significant nest numbers in Turkey and Libya.

### Nesting periods:

- This usually occurs in spring or summer, depending upon location.

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- Caribbean - April to early August
- NW Atlantic - April to September
- SW Atlantic - April to August
- Eastern Mediterranean - June to September
- Senegal - July to October
- South Africa - October - February
- China - April to August
- Australia - October to April

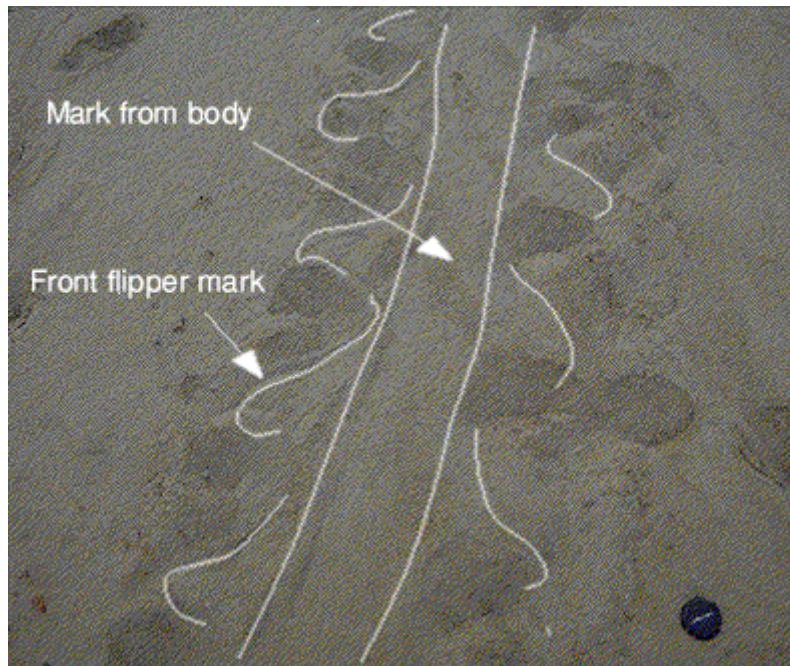


illustration: M. Demma © ICRAM

## Nesting behaviour:

The female usually come ashore at night (records suggest that this may well have once happened during the day in undisturbed sites).

Loggerheads are said to be highly philopatric: returning to the same stretch of coastline to nest each year, probably to the same area where they originally hatched. Some populations are more site specific than others. Nesting sites are only found on sandy, shelving beaches. The nest is usually made at the top of the beach and about 45 cm deep and flask shaped. After laying, the turtle will cover the nest with sand and attempt to camouflage by scattering sand. She will then return to the sea. Loggerheads have a characteristic track as shown in the picture below.



Track is wavy with alternate flipper marks. The outlines are marked in white.  
The turtle is moving down the picture!

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## Egg number, size and weight:

- Most females nest between 2 or 3 times in a season, with a gap of about 14 days between each laying. They lay 40 to 190 eggs, depending on the individual. A single female could lay 560 eggs per season. The reproductive cycle usually involves laying every two or three years although some will lay every year. Clutch sizes vary greatly as shown below.
  - USA (N. Carolina) mean 123: 86-159 eggs: n=36
  - USA (S. Carolina) mean 126: 64-198 eggs: n=71
  - USA (Georgia) mean 120 eggs: n=2827
  - USA (Florida) mean 107: 53-174: n=1928
  - USA (Merrit Island) mean 12: 82-173: n=64
  - Greece (Zakynthos) 52-114 eggs
  - Turkey (Med. coast) mean 93: 55-160: n=50
- Egg size is usually proportional to the size of the turtle e.g. smaller eggs from smaller turtles.
- Mean diameter ranges from 34.7-55.2 mm.
- Eggs in one clutch are very similar in size although a few can be smaller. This contrasts to the Leatherback Sea Turtle, which has a great variation in egg size within one clutch.



Eggs shed by female in Laganas Bay, Zakynthos - Greece

## Incubation time:

- Incubation time varies with beach latitude.
  - USA (Florida) mean 68 days (Lat-26)
  - Mexico (Quintano Roo) mean 56 days (Lat-19)
  - Turkey: mean 57 days (Lat-36)
  - Greece (Zakynthos) mean 57 days (Lat-38)
  - South Africa (Tongaland) mean 68 days (Lat-30)
  - Japan (Hiwasa) mean 58 days (Lat-34)
- There is some considerable degree of variation on any one beach, due to local environmental conditions. Some sites also show considerable variation from one year to the next.

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## Size and weight of hatchlings

Size and weight of the hatchlings correlates directly to the egg size. The mean Straight Carapace Length (SCL) ranges from 33.5-55 mm. Weights vary between 18.8-21.1 g.



illustration: M. Demma © ICRAM

## Maturity:

- The age of maturity is not clear but research in captive specimens puts it between 6 and 20 years. Figures taken from the wild involving back calculations (recapture data from tagged females) suggests 12 to 30 years to maturity. The main difference probably depends on latitude and food availability .



illustration: M. Demma © ICRAM

## Courtship and Mating:

- Unlike most other sea turtle species, courtship and mating is not performed near the nesting beaches but during migration from the feeding to breeding grounds. Copulation is most accomplished whilst floating but does occur underwater. Several matings may take place and there is evidence that sperm from several males may be stored in the oviducts. All eggs for one season can be fertilised from this stored sperm. Mating normally takes place a few weeks before laying.
- **n.b.** Observations in Dalyan ( June Haimoff, Conservationist), Turkey and in Kefalonia, Greece suggest that males do move close in shore to mate and even in fresh water lagoons linked to the sea. Reports from Kefalonia suggest that males seem to set up 'mating' areas which might further suggest some selection process (Kefalonia Marine Turtle Project - Tom Stringell)

## Sex determination:

- Incubation occurs between 26-32°C. Evidence that sex determination is temperature dependent.
- Male-biased in the cool. Key or *pivotal temperature* in which sex ratio is 1:1 is 30°C for the Loggerheads. There is some evidence that this key temperature varies from one location to another.

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## Hatching:

- Hatchlings emerge at night, with a peak time between 21:00 and 02:00 hours. On cool cloudy days this time-period will be longer. Together, the hatchlings dig their way out of the nest. Usually emerging at night, the group makes its way down the beach and enters the sea. This race to the sea is important for the hatchlings' biological cycle.

## Egg mortality and predation:

- In some locations, predation on eggs can be extremely high as shown by work carried out on Dalyan Beach in Turkey (Erk'akan, 1991). Out of an estimated 17,254 eggs laid, 12,078 and 1,725 were predated by foxes and ghost crabs respectively. This predation rate is estimated as high as 70%. On the Northern shores of Cyprus, predation rates are much lower - 38% predated, 8% hatched and predated and 31% unknown (Broderick, 1995) .
- Loggerhead turtles are more prone to predation than Green turtles because their eggs are located closer to the surface of their beach.

## Hatchling mortality and predation:

- Lights near the beach disorientate hatchlings, causing them to wander in the wrong direction. If this happens, they may die of dehydration or are eaten by predators. The highest mortality occurs at this stage. This route to the sea is made more difficult by vehicle tracks and sand pits made during the day by tourists. Hatchlings are too small to climb out of the ruts and soon die of dehydration in the hot sun of the morning. Many eggs are destroyed by natural activities such as erosion or sea overwash, while others are destroyed in the nest by bacteria and fungi, or predators such as racoons (In Florida, 40-50% of the clutch is destroyed by racoons, skunks etc). In Zakynthos (Greece), there has been some damage caused by plant roots entering nests and from other nesting females damaging nests on high density laying beaches, such as Sekania. Mortality varies greatly from site to site.
- Little is known about predation on juveniles and adults but they are generally too large and well armoured for most predators. However, large carnivores like sharks do take turtles. When attacked, adults present their flanks to the predator to prevent biting.
- There have been few quantitative stomach content studies on most sharks although qualitative studies have shown that turtle parts are common in big sharks such as the tiger shark. One recent study showed a link between the increase in viral infections of sea turtles and the decline in shark numbers.
- Monk seals in Greece are also predators of loggerhead turtles, although the numbers they kill are small (Margaritoulis.D, 1995).



Hatchlings swimming out to sea - the *Lost Years*

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## Commensals and disease:

- Loggerheads carry more *epibiotic* animals than the other species of Sea Turtle. There is one barnacle which is specific to the loggerhead, pictured below:



Barnacle on carapace - 35 mm across

- Recent work has suggested that barnacles can cause harm to the turtle and there is a possible correlation between the health of the turtle and the number of barnacles it carries on its carapace. (e-mail via the CTURTLE network, Beasley J, sept. 1996). Leeches can cause skin damage and secondary infection (this may cause the tissue to degenerate, which is then known as a *papillomae*).
- The most important recent disease of sea turtles, especially Greens, is a disorder known as *fibropapillomatosis*. The disease is characterised by one or more fibrous tumours, which are located on areas of soft skin. The tumours are debilitating and can prove fatal. The cause is unknown but a viral infection is suspected. Research is underway in a number of Universities. The disease is becoming more common.

## Feeding:



Jellyfish



Molluscs



Crustaceans

Illustrations: M. Demma © ICRAM

- Feeding changes with age but loggerheads are mainly carnivorous. Loggerheads will eat almost anything and show little real food preferences. They have powerful jaws and can deal with many food types. Their diet has been shown to include:
  - Jellyfish
  - Crustaceans (lobsters, crabs and shrimps)

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- Molluscs ( clams, mussels, conchs etc)
- Encrusting animals attached to reefs and rocks
- Some stomach content analysis has revealed weed and even plastic bags mistaken for jelly-fish. Oil droplets have also been found in the stomachs of hatchlings which have possibly been confused as potential food particles (Wietrich, B. 1994).

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## Threats to Survival

Four key categories can be identified, although threats to loggerheads vary from one region to another.



**Loss of habitat due to coastal development,** including tourism and industrialisation



**Accidental capture by fishing activities**



**Pollution** due to industrial waste, marine debris etc



**Collision** with motorboats



**Photopollution**



**Human predation** due to **egg collecting**, **meat consumption** (not intensive due to low palatability of the meat), **carapace exploitation** (not intensive as poor quality)



**Animal predation**

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