

# Chapter 1 Sea Turtle Taxonomy and Distribution

*Sarah Milton and Peter Lutz*

## *Key Points*

- Sea turtles are long-lived, slow to mature, air-breathing, diving marine reptiles that have terrestrial life stages, primarily nesting and egg development, and hatchlings.
- There are seven living species of sea turtles; five are commonly found in continental U.S. waters: loggerhead, green, leatherback, hawksbill, and Kemp's ridley turtles. The olive ridley turtle is found in U.S. territorial waters in the Pacific.
- All five species found in coastal U.S. waters are listed as endangered or threatened under the Endangered Species Act; all species are on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I list, which prohibits their traffic in international trade.
- Sea turtle species are identified by the numbers and pattern of plates (called **scutes**) on their shells and the scale pattern on their heads.
- While most sea turtles are tropical to subtropical, especially for nesting, some species range as far north as the waters off Newfoundland and Alaska and as far south as the coasts of Chile and Argentina.

**CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora.**

**Scute - plates of the sea turtle shell.**

## *What Is a Sea Turtle?*

The modern sea turtle is a large (35 to 500 kilograms [kg]), long-lived, air-breathing reptile highly adapted and modified for a marine lifestyle. While the most obvious adaptation is the flattened, streamlined shell, or **carapace** (dorsal shell), sea turtles also have highly modified limbs, with the forelimb bones, called **phalanges**, extended to thin, flattened, oarlike flippers for swimming. The paddlelike forelimbs are relatively non-retractable, however, so they make the turtles awkward and vulnerable on land. Other adaptations to marine life include anatomical and physiological means of breathhold diving and excreting excess salt.

**Carapace - dorsal (top) shell of a turtle.**

**Phalanges - long "finger" bones of a turtle flipper.**

Although they are predominantly marine, sea turtles return to land to nest, and after the eggs develop and hatch, the hatchlings return directly to the sea. In some locations (Hawaii and Australia, for example), juveniles, subadults, and adults also come ashore to bask. In addition, sea turtles migrate great distances, traveling hundreds or even thousands of kilometers between foraging and nesting grounds, thus they are excellent navigators as well. Hatchlings orient in part by the earth's magnetic fields, as do migrating adults.

## *Sea Turtle Species and Their Geographic Distribution*

Five species of sea turtles—loggerhead, green, leatherback, Kemp’s ridley, and hawksbill—are commonly found in U.S. coastal waters. A sixth, the olive ridley, is found in U.S. territorial waters. All five species are listed as **endangered** or **threatened** under the U.S. Endangered Species Act. Spill response personnel should be aware that only trained and authorized personnel designated under a federal Endangered Species Act permit or cooperative agreement can be involved in handling sea turtles and their nests. Table 1.1 summarizes the current status of sea turtle species under the act, as well as critical habitat areas: Table 1.2 summarizes their habitats and diets.

**Endangered - Any species of animal or plant that is in danger of extinction throughout all or a significant part of its range (from the Endangered Species Act of 1973).**

**Threatened - any species likely to become endangered in the foreseeable future (from the Endangered Species Act of 1973).**

**Table 1.1 Status of turtle species found in U.S. waters.**

<b>Common and Species Names</b>	<b>Status in the United States</b>	<b>Date of Listing</b>	<b>Critical habitat</b>
Loggerhead <i>Caretta caretta</i>	Threatened throughout its range.	7/28/78	None designated in the United States.
Green <i>Chelonia mydas</i>	Breeding colony populations in Florida and on the Pacific coast of Mexico are listed as endangered; all others are listed as threatened.	7/28/78	50 CFR 226.208 Culebra Island, Puerto Rico – Waters surrounding the island of Culebra from the mean high water line seaward to 3 nautical miles (5.6 km). These waters include Culebra’s outlying Keys including Cayo Norte, Cayo Ballena, Cayos Geniquí, Isla Culebrita, Arrecife Culebrita, Cayo de Luis Peña, Las Hermanas, El Mono, Cayo Lobo, Cayo Lobito, Cayo Botijuela, Alcarraza, Los Gemelos, and Piedra Steven.
Leatherback <i>Dermochelys coriacea</i>	Endangered throughout its range.	6/2/70	50 CFR 17.95 U.S. Virgin Islands – A strip of land 0.2 miles wide (from mean high tide inland) at Sandy Point Beach on the western end of the island of St. Croix beginning at the southwest cape to the south and running 1.2 miles northwest and then northeast along the western and northern shoreline, and from the southwest cape 0.7 miles east along the southern shoreline.  50 CFR 226.207 The waters adjacent to Sandy Point, St. Croix, U.S. Virgin Islands, up to and inclusive of the waters from the hundred fathom curve shoreward to the level of mean high tide with boundaries at 17°42’12” North and 64°50’00” West.
Kemp’s ridley <i>Lepidochelys kempii</i>	Endangered throughout its range.	12/2/70	None designated in the United States.

**Table 1.1 Cont.**

<b>Common and Species Names</b>	<b>Status in the United States</b>	<b>Date of Listing</b>	<b>Critical habitat</b>
Hawksbill <i>Eretmochelys imbricata</i>	Endangered throughout its range.	6/2/70	50 CFR 17.95 Puerto Rico: (1) Isla Mona. All areas of beachfront on the west, south, and east sides of the island from mean high tide inland to a point 150 m from shore. This includes all 7.2 km of beaches on Isla Mona. (2) Culebra Island. The following areas of beachfront on the north shore of the island from mean high tide to a point 150 m from shore: Playa Resaca, Playa Brava, and Playa Larga. (3) Cayo Norte. South beach, from mean high tide inland to a point 150 m from shore. (4) Island Culebrita. All beachfront areas on the southwest facing shore, east facing shore, and northwest facing shore of the island from mean high tide inland to a point 150 m from shore.  50 CFR 226.209 Mona and Monito Islands, Puerto Rico – Waters surrounding the islands of Mona and Monito, from the mean high water line seaward to 3 nautical miles (5.6 km).
Olive ridley <i>Lepidochelys olivacea</i>	Breeding colony populations on the Pacific coast of Mexico are listed as endangered; all others are listed as threatened	7/28/78	None designated in the United States.

Source: <http://northflorida.fws.gov/SeaTurtles/turtle-facts-index.htm>, Code of Federal Regulations.

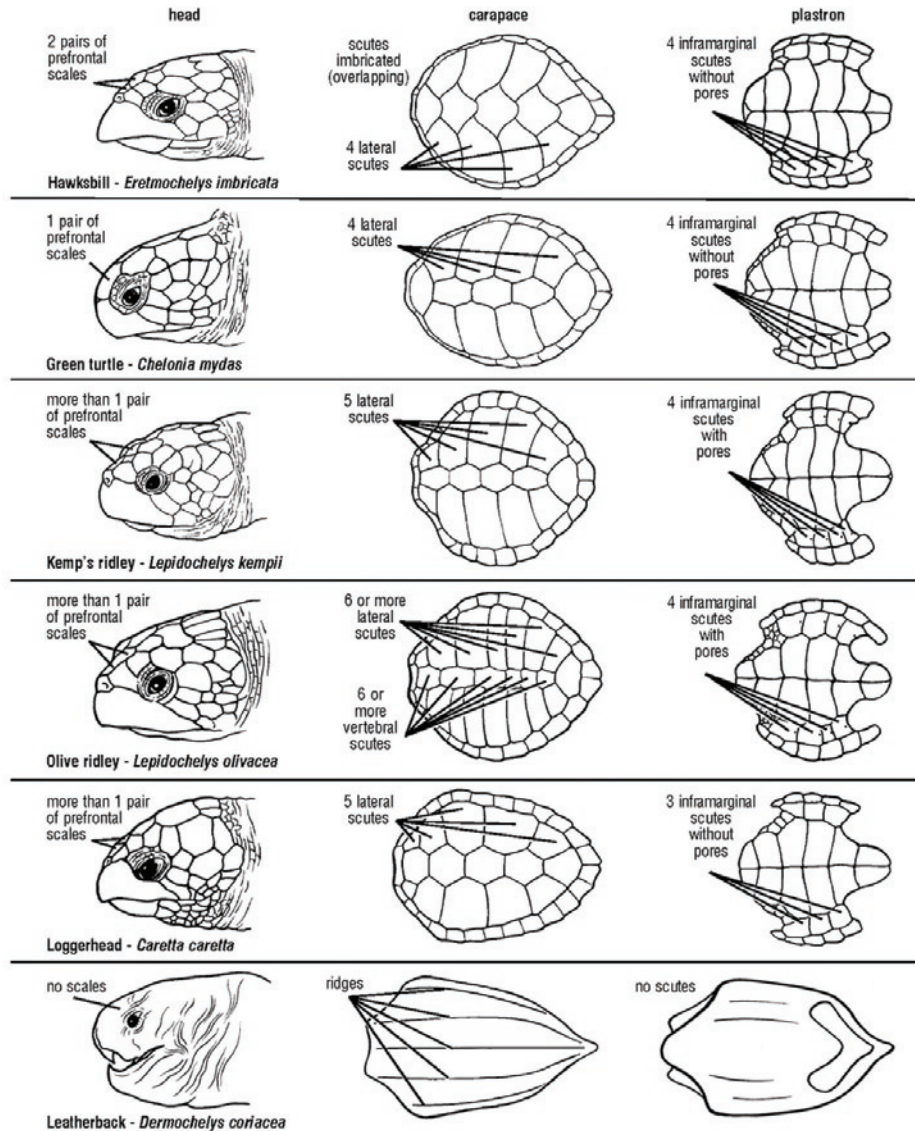
**Table 1.2 Summary of adult habitat and diets for the six sea turtle species found in U.S. waters.**

<b>Species</b>	<b>Habitat</b>	<b>Diet</b>
Loggerhead	Shallow continental shelf, coastal bays	Benthic invertebrates—mollusks and crustaceans
Green	Nearshore, coastal bays	Herbivorous—seagrasses and macroalgae
Leatherback	Pelagic	Jellyfish
Kemp's ridley	Coastal bays, shallow continental shelf	Fish and benthic invertebrates—crustaceans, squid, sea urchins
Hawksbill	Reefs, coastal areas, lagoons	Primarily sponges, also shrimp, squid, anemones
Olive ridley	Coastal bays, shallow continental shelf	Fish and benthic invertebrates—crustaceans, squid, sea urchins

All sea turtle species are on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix I list, which prohibits their traffic in international trade. In addition to coloring, range, and size, sea turtle species are positively identified by the number and pattern of carapace scutes (plates of the shell) and scales on the head (Figure 1.1).

Figure 1.1 Species identification guide to sea turtles found in U.S. territorial waters. Prefrontal scales are those located between the eyes. Lateral scutes lie on each side of the vertebral (center) scutes. Drawing courtesy of Dawn Witherington and Jeanette Wyneken.

### SPECIES IDENTIFICATION



## Loggerhead Turtle, *Caretta caretta*

The loggerhead turtle (Figure 1.2) is the most common nesting turtle found in coastal U.S. waters, where it is listed as threatened under the Endangered Species Act. The southeastern coast of the United States hosts the second largest breeding aggregate of loggerhead turtles in the world, 30 percent of the world's breeding population (the largest breeding population is in Oman). Ninety percent of U.S. nesting occurs along the central and southeast Florida coast, though regular nesting also occurs in Georgia, the Carolinas, and Florida's Gulf coast.



Figure 1.2 Male loggerhead turtle swimming in Argostoli harbor, Kefalonia, Greece. Photo courtesy of Michael White.

### **Identification**

Adults and subadults have reddish-brown carapaces and dull brown to yellowish bottom shells, called **plastrons**. Juveniles are also reddish brown, while hatchlings have a yellowish margin on the carapace and flippers. Loggerhead turtles have more than one pair of prefrontal scales (between the eyes) and five lateral scutes on the carapace (Figure 1.2). Hatchlings and juveniles have sharp keels on the vertebral scutes, which recede with age. Adults in the southeastern United State are approximately 92 centimeters (cm) in straight carapace length (**SCL**), with a mean mass of 113 kg; adults elsewhere are generally somewhat smaller.

### **Range**

Loggerheads range along the east coast of the United States, in the Gulf of Mexico, off southern Brazil, in the northern and southwestern Indian Ocean, near eastern Australia, in Japan, and in the Mediterranean. In the Western Hemisphere, loggerheads may range as far north as Newfoundland (rare) to as far south as Argentina. Along the Pacific coast, loggerheads range from the Gulf of Alaska southward, but are most frequently seen off the western Baja Peninsula. Nesting occurs in the northern and southern temperate zones and subtropics (they generally avoid nesting on tropical beaches).

### **Habitat**

Adult and subadult loggerhead turtles are found primarily in subtropical (occasionally tropical) waters along the continental shelves and estuaries of the Atlantic, Pacific, and Indian Oceans. They are a nearshore species, but may be found in a variety of habitats from turbid, muddy-bottomed bays and bayous to sandy bottom habitats, reefs, and shoals. Juveniles swim directly offshore after hatching and eventually associate with the **sargassum** and pelagic drift lines of convergence zones. Juveniles from the southeastern United States may circumnavigate the entire northern Atlantic gyre before moving to nearshore habitats, when they have grown to 40 to 50 cm SCL.

**Plastron** - ventral (bottom) shell of a turtle.

**SCL** - straight carapace length.

**Sargassum** - genus of brown algae, also known as gulfweed. There are 15 species in the genus, and each has air bladders. Some species are free floating. Off the U.S. coast, south of Bermuda, is the Sargasso Sea, a large (two-thirds the size of the United States), loosely-defined portion of the Atlantic Ocean where an estimated 7 million tons of live sargassum may be found.

## Diet

Adults and subadults feed primarily on benthic mollusks and crustaceans. Hatchlings and juveniles consume coelenterates and cephalopod mollusks associated with pelagic drift lines.

**Cheloniid - hard-shelled sea turtles composed of the genera *Chelonia*, *Caretta*, *Lepidochelys*, *Eretmochelys*, and *Natator*; contrast to *dermochelyid*.**

## **Green Turtle, *Chelonia mydas***

The green turtle (Figure 1.3) is the largest hard-shelled sea turtle (**cheloniid**), and the second most common nesting turtle, in U.S. waters. While considered threatened in most parts of the world, the breeding populations in Florida and on Mexico's Pacific coast are considered endangered.



Figure 1.3 Green turtle. Photo courtesy of Douglas Shea.

## Identification

The adult green turtle has a black to gray to greenish or brown carapace, often with streaks or spots, and a yellowish-white plastron. Hatchlings have a dark brown to black carapace and white plastron, with a white margin along the carapace and rear edges. Greens have one pair of prefrontal scales, four lateral scutes, a small rounded head, and a single visible claw on each flipper. Worldwide, green turtles vary in size and weight among different populations. In Florida, green turtles average 101 to 102 cm in carapace length (SCL) and weigh about 136 kg.

## Range

Adult green turtles, rare in temperate waters, are found in tropical and subtropical waters worldwide. In the United States they range from Texas to the U.S. Virgin Islands, near Puerto Rico, and north to Massachusetts. Major nesting areas are located in Costa Rica, Australia, Ascension Island, and Surinam. In the United States, small numbers nest in Florida, the U.S. Virgin Islands, and Hawaii. Culebra Island, Puerto Rico, is an important foraging area for juveniles.

A subspecies (possibly a distinct species), the black turtle (*Chelonia agassizii*) is confined to the eastern Pacific, with important nesting grounds in Mexico. The black turtle ranges from southern Alaska to southern Chile, but is usually found between Baja California and Peru.

## Habitat

Like other sea turtle species, green turtles use three distinct habitats: nesting beaches, convergence zones in the open sea (hatchlings/juveniles), and benthic foraging grounds (adults/subadults). Juveniles move into benthic feeding grounds in relatively shallow, protected waters when they reach about 20 to 25 cm SCL. Foraging areas consist primarily of seagrass and algae beds, though they are also found over coral and worm



reefs and rocky bottoms. In the United States, important foraging areas include Florida estuaries, such as Indian River Lagoon, and the French Frigate Shoals in Hawaii. Green turtles prefer nesting on high-energy beaches, often on islands.

### **Diet**

Post-hatchling, pelagic-stage green turtles are believed to be omnivorous. Adults and subadults feed primarily on seagrasses and kelp.

### **Leatherback turtle, *Dermochelys coriacea***

The leatherback turtle (Figure 1.4), the largest and most pelagic sea turtle, is easily identified by its lack of scutes (hence the name). The leatherback is listed as endangered.

### **Identification**

This large sea turtle has seven ridges running from front to rear along its back instead of the usual scutes, with a continuous thin, black layer of skin, often with white spots. Leatherbacks have no scales on their heads and no claws on their flippers. They range in size from 150 to 170 cm SCL, and may grow to 500 kg (rarely, even to 900 kg). Hatchlings also have carapace ridges and lack scutes; they are two to three times larger than other sea turtle hatchlings.

### **Range**

Adult leatherbacks may range as far north as the coastal waters off Newfoundland or the Gulf of Alaska: this is the species most frequently found stranded on beaches of northern California. Nesting is entirely tropical, however, occurring in Mexico, the eastern Pacific, Guyana, the South Pacific (Malaysia), coastal Africa, and the Caribbean (Costa Rica, Surinam, French Guiana, and Trinidad). Very small numbers (20 to 30) nest along the Florida coast each year, with larger numbers nesting in the U.S. Virgin Islands (St. Croix in particular) and Puerto Rico (mainland and Culebra Island).

### **Habitat**

Leatherbacks are primarily pelagic, deep-diving animals. They are occasionally seen in coastal waters, more frequently when nesting.

### **Diet**

Leatherbacks primarily eat jellyfish and other coelenterates that inhabit the water column in the open ocean and pelagic colonial tunicates (*pyrosomas*).

**Dermochelyid - leathery-shelled sea turtles (i.e., leatherback).**



*Figure 1.4 A leatherback turtle covers her nest in French Guiana. Photo courtesy of Matthew Godfrey.*

**Pyrosoma - pelagic colonial tunicate; most species inhabit tropical waters, with some up to 4 m in length.**

## **Kemp's Ridley Turtle, *Lepidochelys kempii***

The Kemp's ridley (Figure 1.5), along with the olive ridley, is the smallest of all sea turtles. Listed as an endangered species, this is the rarest sea turtle in the world, and it has the most restricted range of all U.S. sea turtle species.



*Figure 1.5 A Kemp's ridley turtle.  
Photo courtesy of Dr. Jeanette  
Wynneken, Florida Atlantic  
University.*

### **Identification**

The small adult Kemp's ridley sea turtle has a light gray to olive or gray-green carapace and a creamy white or yellowish plastron. Hatchlings are gray-black on both carapace and plastron. Kemp's ridleys have more than one pair of prefrontal scales and five lateral scutes. Adults usually weigh less than 45 kg, with an SCL averaging 65 cm (nesting females range from 52 to 75 cm), and they are almost as wide as they are long.

### **Range**

Except for the Australian flatback turtle, the Kemp's ridley has the most restricted range of all sea turtles, occurring primarily in the coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. The primary nesting beach is near Rancho Nuevo, on Mexico's northeast coast. While adults are confined almost exclusively to the Gulf of Mexico, the northeastern coast of the United States appears to be an important habitat for juveniles, which are often found in waters off New York and New England.

### **Habitat**

As with other sea turtles, little is known of the Kemp's ridleys' post-hatchling, planktonic life stage. Young animals presumably feed on sargassum and associated infauna in the Gulf of Mexico. As juveniles, they frequent bays, coastal lagoons, and river mouths, then as adults move into crab-rich areas of the Gulf of Mexico over sandy or muddy bottoms.

### **Diet**

Juvenile and adult Kemp's ridleys are primarily crab-eaters. They also consume fish and a variety of invertebrates such as sea urchins and squid.



## Hawksbill Turtle, *Eretmochelys imbricata*

The hawksbill turtle (Figure 1.6) is the most tropical sea turtle, and it is one of the most heavily poached, both as juveniles and adults, to obtain “tortoiseshell.” Hawksbills are endangered throughout their range.

### Identification

The hawksbill turtle has thick carapace scutes, with streaks of brown and black on an amber background. The rear edge of the carapace is deeply serrated. Hawksbills have two pairs of prefrontal scales and four overlapping lateral scutes; a small, narrow head that tapers to a distinct hooked beak; and two claws on the front of its flippers. The second smallest sea turtle, nesting females vary in size from 27 to 86 kg, with an SCL of 53 to 114 cm (the average is 95 cm).

### Range

Hawksbills are found throughout the tropical oceans, with larger populations in Malaysia, Australia, the Western Atlantic from Brazil to South Florida, throughout the Caribbean, and in the southwestern Gulf of Mexico. In U.S. waters, hawksbills are found in the U.S. Virgin Islands (nesting beaches are in Buck Island National Monument, St. Croix), Puerto Rico (nesting beaches are on Mona Island, Figure 1.7), South Florida, along the Pacific coast from southern California southward, and in Hawaii.

### Habitat

Hawksbills forage near rock or reef habitats in clear, shallow tropical waters. They are most common near a variety of reefs, from vertical underwater cliffs to gorgonian (soft coral) flats, and are found over sea-grass or algae meadows. Adults are not usually found in waters less than 20 m deep, while juveniles rarely leave shallow coral reefs. Pelagic-stage hawksbills presumably are associated with sargassum rafts, moving into shallow reefs when they reach 15 to 25 cm SCL, then into deeper waters as their size and diving capabilities increase.

### Diet

Hawksbill turtles feed primarily on sponges (in the Caribbean, on only a few distinct species), but may also forage on corals, tunicates, and algae.



*Figure 1.6 A hawksbill turtle. Photo of “Ake” courtesy of Ursula Keuper-Bennett.*



*Figure 1.7 Hawksbill hatchlings emerge from a nest on Pajaros Beach, Isla de la Mona, in the Mona Channel west of Puerto Rico. Photo courtesy of Michelle Schärer, Department of Marine Sciences, University of Puerto Rico-RUM.*



Figure 1.8 An olive ridley turtle. Photo courtesy of Janos Csernoch, Programa Restauración de Tortugas Marinas, Costa Rica

## Olive Ridley Turtle, *Lepidochelys olivacea*

The olive ridley (Figure 1.8), while probably the most numerous sea turtle worldwide, is rare in U.S. waters.

### Identification

The olive ridley, like its close relative the Kemp's ridley, is a small turtle. The adult carapace is dark gray and nearly round; hatchlings are gray-brown. Olive ridleys have two claws on each limb, more than one pair of prefrontal scales, and six or more lateral scutes.



Figure 1.9 Olive ridley turtles leave the beach at Ostional, Costa Rica. Photo courtesy of Janos Csernoch, Programa Restauración de Tortugas Marinas, Costa Rica.

### Range

The olive ridley is found in Pacific and South Atlantic waters, but may occasionally be found in the tropical North Atlantic. Along the Pacific coast, the olive ridley ranges from the Gulf of Alaska to Central America, but is most common in the southern portion of this range. Enormous nesting aggregations, called **arribadas**, occur at two sites on Costa Rica's Pacific coast (Figure 1.9), one site on Mexico's Pacific coast, and two or three in northeastern India. Smaller nesting sites are found in Nicaragua and scattered along other tropical mainland shores.

### Habitat

Olive ridleys are associated with relatively deep, soft-bottomed habitats inhabited by crabs and other crustaceans. They are common in pelagic habitats but also feed in shallower benthic habitats, sometimes near estuaries.

### Diet

Carnivorous to omnivorous, olive ridley stomach contents have included crabs, mollusks, gastropods, fish, fish eggs, and algae.

**Arribada - mass nesting aggregation; Spanish, meaning literally, "arrived."**

## Flatback Turtle, *Natator depressus*



Figure 1.10 A flatback turtle on Abullion Island, Lornedol Island group, Western Australia. Photo courtesy of Kellie Pendoley, Murdoch University, Australia.

The flatback turtle (Figure 1.10) is confined to the waters along the northeast to northwest coast of Australia. The adult carapace is a dull olive-gray edged with pale brownish-yellow, and the plastron is creamy white. The flatback inhabits inshore turbid waters in coastal areas along the main coral reefs and continental islands, where it feeds on a varied diet that includes algae, squid, invertebrates, and mollusks.

## *For Further Reading*

- Bjorndal, K. A. 1982. *Biology and Conservation of Sea Turtles*, Smithsonian Institution Press, Washington, D.C.
- Gulf of the Farallones National Marine Sanctuary. 1994. *Beached Marine Birds and Mammals of the North American West Coast*, NOAA Sanctuaries and Reserves Division, U.S. Dept. of Commerce, 1443-CX-8140-93-011, 1994.
- Lutz, P. L., and J. A. Musick, eds. 1997. *The Biology of Sea Turtles*, Vol. I. CRC Press, Boca Raton, Fla.
- Lutz, P. L., J. A. Musick, and J. Wyneken, eds. 2002. *The Biology of Sea Turtles*, Vol. II. CRC Press, Boca Raton, Fla.
- National Research Council. 1990. *Decline of the Sea Turtles*, National Academy Press, Washington, D.C.
- Pritchard, P. C. H. 1997. Evolution, phylogeny, and current status. In: *The Biology of Sea Turtles*, Vol. I, P. L. Lutz and J. A. Musick, eds. CRC Press, Boca Raton, Fla. pp. 1–28
- Pritchard, P. C. H. 1982. Nesting of the leatherback turtle *Dermochelys coriacea* in Pacific Mexico, with a new estimate of world population status. *Copeia* 3: 741.
- Wyneken, J. 2002. The anatomy of sea turtles. NOAA Tech. Memo. NMFS-SEFSC-470, Miami, Fla.

