

= Hawksbill sea turtle =

The hawksbill sea turtle (*Eretmochelys imbricata*) is a critically endangered sea turtle belonging to the family Cheloniidae . It is the only extant species in the genus *Eretmochelys* . The species has a worldwide distribution , with Atlantic and Indo @-@ Pacific subspecies ? *E. i. imbricata* and *E. i. bisssa* , respectively .

The hawksbill 's appearance is similar to that of other marine turtles . In general , it has a flattened body shape , a protective carapace , and flipper @-@ like limbs , adapted for swimming in the open ocean . *E. imbricata* is easily distinguished from other sea turtles by its sharp , curving beak with prominent tomium , and the saw @-@ like appearance of its shell margins . Hawksbill shells slightly change colors , depending on water temperature . While this turtle lives part of its life in the open ocean , it spends more time in shallow lagoons and coral reefs . Human fishing practices threaten *E. imbricata* populations with extinction . The World Conservation Union classifies the hawksbill as critically endangered . Hawksbill shells were the primary source of tortoiseshell material used for decorative purposes . The Convention on International Trade in Endangered Species outlaws the capture and trade of hawksbill sea turtles and products derived from them .

= = Anatomy and morphology = =

E. imbricata has the typical appearance of a marine turtle . Like the other members of its family , it has a depressed body form and flipper @-@ like limbs adapted for swimming .

Adult hawksbill sea turtles have been known to grow up to 1 m (3 ft) in length , weighing around 80 kg (180 lb) on average . The heaviest hawksbill ever captured was measured to be 127 kg (280 lb) . The turtle 's shell , or carapace , has an amber background patterned with an irregular combination of light and dark streaks , with predominantly black and mottled @-@ brown colors radiating to the sides .

Several characteristics of the hawksbill sea turtle distinguish it from other sea turtle species . Its elongated , tapered head ends in a beak @-@ like mouth (from which its common name is derived) , and its beak is more sharply pronounced and hooked than others . The hawksbill 's fore limbs have two visible claws on each flipper .

One of the hawksbill 's more easily distinguished characteristics is the pattern of thick scutes that make up its carapace . While its carapace has five central scutes and four pairs of lateral scutes like several members of its family , *E. imbricata* 's posterior scutes overlap in such a way as to give the rear margin of its carapace a serrated look , similar to the edge of a saw or a steak knife . The turtle 's carapace has been known to reach almost 1 m (3 ft) in length . The hawksbill appears to frequently employ its sturdy shell to insert its body into tight spaces in reefs .

Hawksbill sea turtles ' sand tracks are asymmetrical , because they crawl on land with an alternating gait . By contrast , the green sea turtle and the leatherback turtle crawl rather symmetrically .

Due to its consumption of venomous cnidarians , hawksbill sea turtle flesh can become toxic .

The hawksbill sea turtle has been shown to be biofluorescent and is the first reptile recorded with this characteristic . It is unknown if this is derived from the turtle 's diet , which includes biofluorescent organisms like the hard coral *Physogyra lichtensteini* . Males have more intense pigmentation than females , and a behavioural role of these differences is speculated .

= = Distribution = =

Hawksbill sea turtles have a wide range , found predominantly in tropical reefs of the Indian , Pacific , and Atlantic Oceans . Of all the sea turtle species , *E. imbricata* is the one most associated with warm tropical waters . Two major subpopulations are known , in the Atlantic and Indo @-@ Pacific .

= = = Atlantic subpopulation = = =

In the Atlantic , hawksbill populations range as far west as the Gulf of Mexico and as far southeast as the Cape of Good Hope in South Africa . They live off the Brazilian coast (specifically Bahia , Fernando de Noronha) through southern Florida and the waters off Virginia .

In the Caribbean , the main nesting beaches are in the Lesser Antilles , Barbados , Guadeloupe , Tortuguero in Costa Rica , and in the Yucatan . They feed in the waters off Cuba and around Mona Island near Puerto Rico among other places .

= = = Indo @-@ Pacific subpopulation = = =

In the Indian Ocean , hawksbills are a common sight along the east coast of Africa , including the seas surrounding Madagascar and nearby island groups , and all along the southern Asian coast , including the Persian Gulf , the Red Sea , and the coasts of the Indian Subcontinent and Southeast Asia . They are present across the Malay Archipelago and northern Australia . Their Pacific range is limited to the ocean 's tropical and subtropical regions . In the west , it extends from the southwestern tips of the Korean Peninsula and the Japanese Archipelago south to northern New Zealand .

The Philippines hosts several nesting sites , including the island of Boracay and Punta Dumalag in Davao City . A small group of islands in the southwest of the archipelago has been named the " Turtle Islands " because two species of sea turtles nest there : the hawksbill and the green sea turtle . In January 2016 , a juvenile was seen in Gulf of Thailand . In Hawaii , hawksbills mostly nest on the " main " islands of Oahu , Maui , Molokai , and Hawaii . In Australia , hawksbills are known to nest on Milman Island in the Great Barrier Reef . Hawksbill sea turtles nest as far west as Cousine Island in the Seychelles , where the species has been legally protected since 1994 , and the population is showing some recovery . The Seychelles ' inner islands and islets , such as Aldabra , are popular feeding grounds for immature hawksbills .

= = = Eastern Pacific subpopulation = = =

In the eastern Pacific , hawksbills are known to occur from the Baja Peninsula in Mexico south along the coast to southern Peru . Nonetheless , as recently as 2007 , the species had been considered largely extirpated in the region . Important remnant nesting and foraging sites have since been discovered in Mexico , El Salvador , Nicaragua , and Ecuador , providing new opportunities for research and conservation . In contrast to their traditional roles in other parts of the world , where hawksbills primarily inhabit coral reefs and rocky substrate areas , in the eastern Pacific , hawksbills tend to forage and nest principally in mangrove estuaries , such as those present in the Bahia de Jiquilisco (El Salvador) , Gulf of Fonseca (Nicaragua , El Salvador , and Honduras) , Estero Padre Ramos (Nicaragua) , and the Gulf of Guayaquil (Ecuador) . Multi @-@ national initiatives , such as the Eastern Pacific Hawksbill Initiative , are currently pushing efforts to research and conserve the population , which remains poorly understood .

= = Ecology = =

= = = Habitat = = =

Adult hawksbill sea turtles are primarily found in tropical coral reefs . They are usually seen resting in caves and ledges in and around these reefs throughout the day . As a highly migratory species , they inhabit a wide range of habitats , from the open ocean to lagoons and even mangrove swamps in estuaries . Little is known about the habitat preferences of early life @-@ stage *E. imbricata* ; like other young sea turtles , they are assumed to be completely pelagic , remaining at sea until they mature .

= = = Feeding = = =

While the hawksbill sea turtles mainly feed on sponges found on coral reefs , they also feed on crustaceans , algae , and fish . They are prey to large fish , sharks , and humans . The hawksbill sea turtles are unfortunately endangered mainly due to human impact . These sea turtles mainly stay close to shorelines as this is where sponge @-@ bearing coral reefs can be found , as well as beaches that provide nesting sites .

While they are omnivorous , sea sponges are their principal food ; they constitute 70 ? 95 % of the turtles ' diets in the Caribbean . However , like many spongivores , they feed only on select species , ignoring many others . Caribbean populations feed primarily on the orders Astrophorida , Spirophorida , and Hadromerida in the class Demospongiae . Aside from sponges , hawksbills feed on algae , cnidarians , comb jellies and other jellyfish , and sea anemones . They also feed on the dangerous jellyfish @-@ like hydrozoan , the Portuguese man o ' war (*Physalia physalis*) . Hawksbills close their unprotected eyes when they feed on these cnidarians . The man o ' war 's stinging cells cannot penetrate the turtles ' armored heads .

Hawksbills are highly resilient and resistant to their prey . Some of the sponges they eat , such as *Aaptos aaptos* , *Chondrilla nucula* , *Tethya actinia* , *Spheciospongia vesparium* , and *Suberites domuncula* , are highly (often lethally) toxic to other organisms . In addition , hawksbills choose sponge species with significant numbers of siliceous spicules , such as *Ancorina* , *Geodia* (*G. gibberosa*) , *Ecionemia* , and *Placospongia* .

= = Life history = =

Not much is known about the life history of hawksbills . Their life history can be divided into three phases , namely the pelagic phase , from hatching to about 20 cm , the benthic phase , when the immature turtles recruit to foraging areas , and the reproductive phase , when they reach sexual maturity . The pelagic phase possibly lasts until the turtles reach around 20 cm in length in 1 ? 3 years , reaching sexual maturity at around 40 cm (2 ? 4 years) . Hawksbills show a degree of fidelity after recruiting to the benthic phase , however movement to other similar habitats is possible .

= = = Breeding = = =

Hawksbills mate biannually in secluded lagoons off their nesting beaches in remote islands throughout their range . Mating season for Atlantic hawksbills usually spans April to November . Indian Ocean populations , such as the Seychelles hawksbill population , mate from September to February . After mating , females drag their heavy bodies high onto the beach during the night . They clear an area of debris and dig a nesting hole using their rear flippers , then lay clutches of eggs and cover them with sand . Caribbean and Florida nests of *E. imbricata* normally contain around 140 eggs . After the hours @-@ long process , the female returns to the sea .

The baby turtles , usually weighing less than 24 g (0 @.@ 85 oz) hatch at night after around two months . These newly emergent hatchlings are dark @-@ colored , with heart @-@ shaped carapaces measuring around 2 @.@ 5 cm (0 @.@ 98 in) long . They instinctively crawl into the sea , attracted by the reflection of the moon on the water (possibly disrupted by light sources such as street lamps and lights) . While they emerge under the cover of darkness , baby turtles that do not reach the water by daybreak are preyed upon by shorebirds , shore crabs , and other predators .

= = = Maturity = = =

Hawksbills evidently reach maturity after 20 years . Their lifespan is unknown . Like other sea turtles , hawksbills are solitary for most of their lives ; they meet only to mate . They are highly migratory . Because of their tough carapaces , adults ' only predators are sharks , estuarine crocodiles , octopuses , and some species of pelagic fish .

A series of biotic and abiotic cues , such as individual genetics , foraging quantity and quality , or population density , may trigger the maturation of the reproductive organs and the production of gametes and thus determine sexual maturity . Like many reptiles , all marine turtles of a same aggregation are highly unlikely to reach sexual maturity at the same size and thus age . Age at maturity has been estimated to occur between 10 and 25 years of age for Caribbean hawksbills . Turtles nesting in the Indo @-@ Pacific region may reach maturity at a minimum of 30 to 35 years .

= = Evolutionary history = =

Within the sea turtles , *E. imbricata* has several unique anatomical and ecological traits . It is the only primarily spongivorous reptile . Because of this , its evolutionary position is somewhat unclear . Molecular analyses support placement of *Eretmochelys* within the taxonomic tribe Carettini , which includes the carnivorous loggerhead and ridley sea turtles , rather than in the tribe Chelonini , which includes the herbivorous green turtle . The hawksbill probably evolved from carnivorous ancestors .

= = Etymology and taxonomic history = =

Linnaeus originally described the hawksbill sea turtle as *Testudo imbricata* in 1766 , in the 12th edition of his *Systema Naturae* . In 1843 , Austrian zoologist Leopold Fitzinger moved it into genus *Eretmochelys* . In 1857 , the species was temporarily misdescribed as *Eretmochelys imbricata squamata* .

Two subspecies are accepted in *E. imbricata* 's taxon . *E. i. bissa* (Rüppell , 1835) refers to populations that reside in the Pacific Ocean . The Atlantic population is a separate subspecies , *E. i. imbricata* (Linnaeus , 1766) . The nominate subspecies is the Atlantic taxon , because Linnaeus ' type specimen was from the Atlantic .

Fitzinger derived the genus ' name , *Eretmochelys* , from the Greek roots *eretmo* and *chelys* , corresponding to " oar " and " turtle " , respectively . The name refers to the turtles ' oar @-@ like front flippers . The species ' name *imbricata* is Latin , corresponding to the English term *imbricate* . This appropriately describes the turtles ' overlapping posterior scutes . The Pacific hawksbill 's subspecies name , *bissa* , is Latin for " double " . The subspecies was originally described as *Caretta bissa* ; the term referred to the then @-@ species being the second species in the genus . *Caretta* is the genus of the hawksbill 's much larger relative , the loggerhead turtle .

= = Exploitation by humans = =

Throughout the world , hawksbill sea turtles are taken by humans , though it is illegal to hunt them in many countries . In some parts of the world , hawksbill sea turtles are eaten as a delicacy . As far back as the fifth century BC , sea turtles , including the hawksbill , were eaten as delicacies in China .

Many cultures also use turtles ' shells for decoration . These turtles have been harvested for their beautiful shell since Egyptian times , and the material known as tortoiseshell is normally from the hawksbill . In China , where it was known as *tai mei* , the hawksbill is called the " tortoise @-@ shell turtle " , named primarily for its shell , which was used for making and decorating a variety of small items , as it was in the West . In Japan , the turtles are also harvested for their shell scutes , which are called *bekko* in Japanese . It is used in various personal implements , such as eyeglass frames and the *shamisen* (Japanese traditional three @-@ stringed instrument) picks . In 1994 , Japan stopped importing hawksbill shells from other nations . Prior to this , the Japanese hawksbill shell trade was around 30 @,@ 000 kg (66 @,@ 000 lb) of raw shells per year . In the West , hawksbill sea turtle shells were harvested by the ancient Greeks and ancient Romans for jewelry , such as combs , brushes , and rings . The bulk of the world 's hawksbill shell trade originates in the Caribbean . In 2006 , processed shells were regularly available , often in large amounts , in countries including the Dominican Republic and Colombia .

The hawksbill sea turtle appears on the reverse side of the Venezuelan 20 @-@ bolivar and the

Brazilian 2 @-@ reais banknotes . A much @-@ beloved fountain sculpture of a boy riding a hawksbill , affectionately known as Turtle Boy , stands in Worcester , Massachusetts .

= = Conservation = =

Consensus has determined sea turtles , including *E. imbricata* to be , at the very least , threatened species because of their slow growth and maturity , and slow reproductive rates . Many adult turtles have been killed by humans , both accidentally and deliberately , for instance , due to loss of nesting , pollution and coastal development . In addition , human and animal encroachment threatens nesting sites , and small mammals dig up eggs . In the US Virgin Islands , mongooses raid hawksbill nests (along with those of other sea turtles , such as *Dermochelys coriacea*) right after they are laid .

In 1982 , the IUCN Red List of Threatened Species first listed *E. imbricata* as endangered . This endangered status continued through several reassessments in 1986 , 1988 , 1990 , and 1994 until it was upgraded in status to critically endangered in 1996 . Two petitions challenged its status as an endangered species prior to this , claiming the turtle (along with three other species) had several significant stable populations worldwide . These petitions were rejected based on their analysis of data submitted by the Marine Turtle Specialist Group (MTSG) . The data given by the MTSG showed the worldwide hawksbill sea turtle population had declined by 80 % in the three most recent generations , and no significant population increase occurred as of 1996 . CR A2 status was denied , however , because the IUCN did not find sufficient data to show the population likely to decrease by a further 80 % in the future .

The species (along with the entire family Cheloniidae) has been listed on Appendix I of the Convention on International Trade in Endangered Species . It is illegal to import or export turtle products , or to kill , capture , or harass hawksbill sea turtles .

Local involvement in conservation efforts has also increased in the past few years .

The United States Fish and Wildlife Service and National Marine Fisheries Service have classified hawksbills as endangered under the Endangered Species Act since 1970 . The US government established several recovery plans for protecting *E. imbricata* .