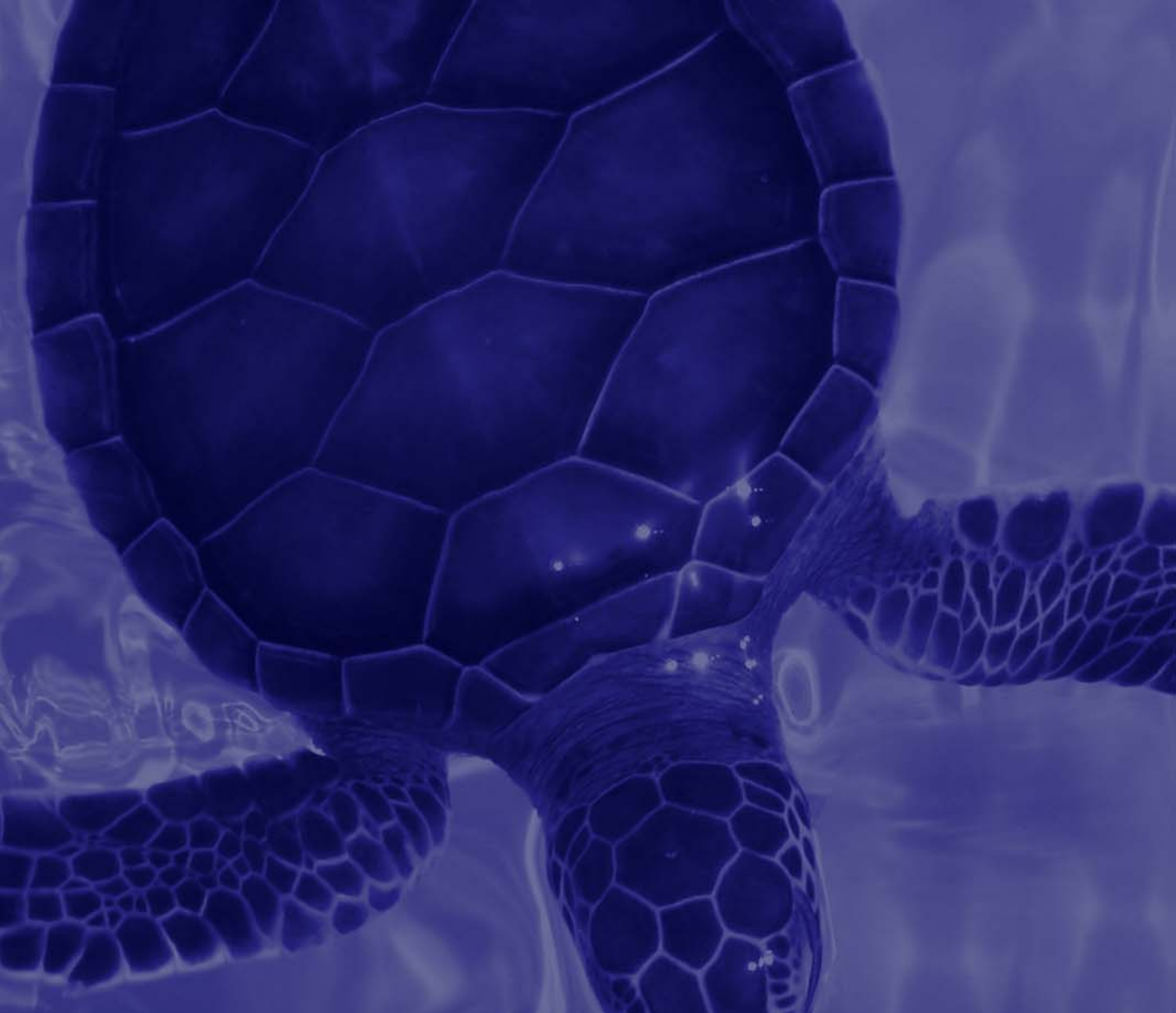

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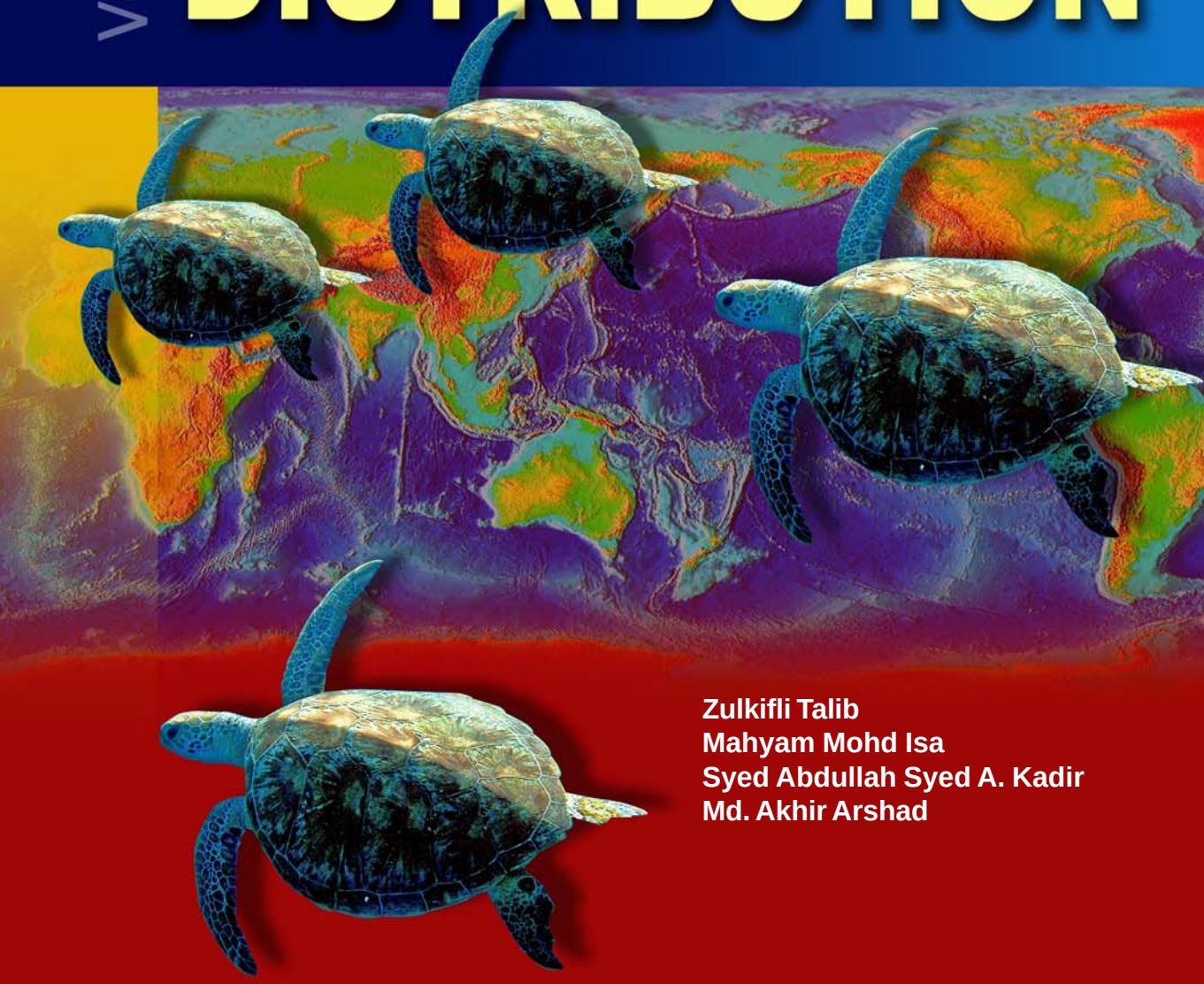
SEA TURTLE
INFORMATION KIT

Volume 2

SEA TURTLE DISTRIBUTION



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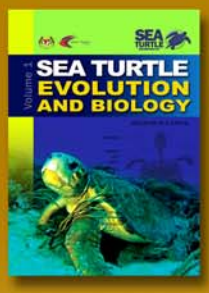

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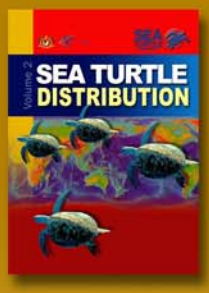

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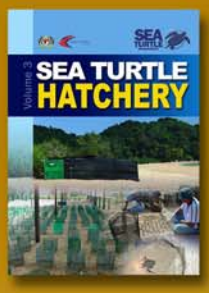

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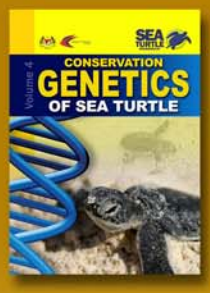


Volume 4

Volume 5

Sea Turtle Information Kit

Sea turtles are valued by people around the world. They are symbol of longevity, fertility, strength and protection from harm. However, sea turtles have also been exploited for their meat, eggs, shells and oil for years. This negatives impacts have accelerated the decline of the sea turtles population worldwide. The Sea Turtle Information Kit is specifically aimed at enhancing awareness, knowledge and understanding of the sea turtles among the public. It is hoped that the Sea Turtle Information Kit will help spread awareness among the public to protect and conserve the sea turtles and also the marine environment as a whole.

Message from the Honourable Dato' Junaidi bin Che Ayub, the Director-General of Fisheries Malaysia

The Southeast Asia holds a strong appeal to a myriad variety of sea creatures and one of these is the sea turtles. The region produces six of the seven living sea turtle species found worldwide and four of them are found nesting in Malaysia: green turtle (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and olive ridley (*Lepidochelys olivacea*).

Malaysia has, as early as in 1961, initiated and implemented conservation and management programs for the four species of sea turtles that occur in her waters. All the species which constitute a unique heritage in Malaysia have been accorded special attention through various conservation strategies to ensure their adequate conservation and protection.

In a world of diminishing natural heritage caused, in some cases by man-made pollution and overexploitation for commercial reasons, any effort to conserve the sea turtle from total annihilation is a virtuous idea that should be supported by all parties.

The Sea Turtle Information Kit is published to develop awareness, knowledge and understanding of sea turtles among the people. It is not easy to make people understand the serious and complex problems facing the sea turtles. However, with the publication of the Sea Turtle Information Kit it is hoped that it will drive home the message concerning the importance of sea turtles conservation.

I wish to congratulate the team for coming up with the Sea Turtle Information Kit. It is timely that such publication is produced to highlight the plight of the sea turtle. The sea turtles have been around since the dinosaurs' era. Let us protect these remarkable creatures and the habitats that they need to survive.

Dato' Junaidi bin Che Ayub
Putrajaya

1 December 2006

Foreword
Chief of
SEAFDEC-MFRDMD

The sea turtles have roamed Earth's oceans and sea for million of years. They were on Earth 150 millions years ago, and they have outlived almost all of the prehistoric animals with which they once shared the planet. Sea turtle survived the extinction of the dinosaurs and are still present in the world's ocean today.

Sea turtles once were found by the millions, but the demand for turtle meat, eggs, shell, leather and oil has greatly reduced their numbers. Their populations continue to decline because of the trade in sea turtle product and the loss of essential habitats.

Conservation is about reducing and removing the threat. But in reality, the work of conservation does not lie principally with the animals, plants and ecosystem but actually lies in dealing with humans. Although conservation programs are in existence, results in general have not been encouraging. The Sea Turtle Information Kit is produced with the intention of spreading awareness, knowledge and understanding to make people realize the importance of sea turtles conservation. It is our duty to make sure that the sea turtles still exist for our future generation to see.

I would like to take this opportunity to congratulate the team members headed by Ms Hjh. Mahyam bte Mohd Isa who have worked tirelessly to come up with this Sea Turtle Information Kit. Without their initiatives and sincere commitments, the Sea Turtle Information Kit would not have been realized.

Finally, I would like to express our thanks and gratitude to the Honorable Dato' Junaidi bin Che Ayub, the Director-General of Fisheries Malaysia, for the continuous support and confidence in the team members.

Raja Mohammad Noordin bin Raja Omar
Kuala Terengganu

1 December 2006

Contents

INTRODUCTION

Scientists recognized seven living species of sea turtles, which are grouped into six genera. The seven species of sea turtles are leatherback *(Dermochelys coriacea),* green *(Chelonia mydas),* hawksbill *(Eretmochelys imbricata),* olive ridley *(Lepidochely olivaceae),* loggerhead *(Caretta caretta),* flatback *(Natator depressus)* and kemp's ridley *(Lepidochelys kempii).* Each sea turtle has both a scientific name and a common name. The scientific name identifies the genus and species, and the common name typically describes some characteristic of the turtle's body.

Sea turtles are large turtles that inhabit warm waters of our planet's oceans, bays and estuaries. They are similar to their terrestrial (land) cousins, the tortoises, and to freshwater turtles, except that their legs have been modified into flippers to aid them in swimming. Their shape has taken on a flattened, more streamlined appearance-tapering off in the rear to allow for less water resistance during swimming. All sea turtles except the leatherback turtles have a hard carapace (top shell) and another hard shell on the belly called the plastron. The carapace, as with all turtles incorporates their backbone, sternum and ribs. This is unlike most other animals whose backbone and ribs are free of a shell or skin.

Different species of sea turtles like to eat different kinds of food. Sea turtles have mouth and jaws that are specially formed to help them eat the food they like. Each species of sea turtles eats, sleeps, mates and swims in distinctly different areas. Sometimes their habitats overlap, but for most part they each have different preferences.

WORLD DISTRIBUTION

Leatherback Turtle

The Leatherback is the largest of all sea turtles. They grow to an average of 1.5 m and vary between 1.24 and 2.56 m. The Leatherback is best adapted to low temperature and because of this, it is the most widely distributed of all sea turtles.

Leatherback Turtle

When they are not nesting on beaches, this giant sea creatures move erratically through waters where there is an abundance of food. They feed mainly on jellyfish and other soft-bodied preys. The Leatherback inhabits seas and oceans throughout the world. It can be found in the waters of the Atlantic, Pacific and Indian oceans and occasionally in the Mediterranean Sea. Because of its feeding habits, it is usually found in tropical and subtropical waters but it is also regularly seen in the North Sea, Argentina, Chile, the Gulf of Mexico, the east and west coasts of the United States, Spain and Portugal. Majority of the adults spend their time in open waters but little is known about where the new born turtles go once they leave the beaches.

The Leatherback inhabits waters far from the coast and in general only comes to the coast to nest. However, small groups of turtles have been seen moving together in coastal waters, particularly in areas where there are a large number of jellyfish on which to feed.

Green Turtle

This is a circumglobal species where most of important nesting and feeding grounds lie within the tropics. It has major nestings colonies on mainland shores, barrier reef islands and remote oceanic islands. They inhabit the neritic zone, occurring in nearshore and inshore waters where they forage primarily on sea grasses and algae. They temporarily inhabit the oceanic zone during migrations from foraging areas to breeding areas and back. Some of these long-distance reproductive migrations are spectacular feats, with turtles swimming thousand of kilometers across the open ocean directly to beaches that are located on small, isolated oceanic islands.

Green Turtle

Post-nesting females migrate hundreds to thousands of kilometers from their nesting beach to resident coastal foraging areas. Post-breeding males also migrate long distances from breeding areas to foraging ground at the end of the mating season or may remain within the vicinity of the nesting beach.

Hawksbill Turtle

Hawksbills are distributed in tropical waters throughout much of the Atlantic, Pacific and Indian Ocean. Hawksbill live in close association with hard-substrate communities such as coral reefs, where they forage primarily on sponges. They may also occur in coastal lagoons and bays. Hawksbills were once believed to be non-migratory residents of reef adjacents to their respective nesting beaches but post-reproductive tagging, telemetry and genetics studies have revealed that hawksbills do indeed migrate. Many are highly migratory, traveling hundreds to thousand of kilometers between nesting beaches and foraging areas.

Olive Ridley Turtle

The olive ridley has a circumtropical distribution, occurring in the Atlantic, Pacific and Indian Ocean. Knowledge of olive ridleys migration is fragmentary throughout most of its range, with exception of the eastern Pacific and the northern Indian Ocean. The olive ridley is highly migratory and spend most of its non-breeding life cycle in the oceanic zone.

Olive Ridley Turtle

Olive ridley occupy the neritic zone during breeding season. Reproductively active males and females migrate toward the coast and aggregate at nearshore breeding grounds located near beaches where mass nesting emergences also occur. A significant proportion of the breeding also takes place far from shore and some males and females may not migrate to nearshore breeding aggregations. Some males appear in oceanic waters and they are non-aggregated and mate opportunistically as they intercept female enroute to nearshore breeding grounds and nesting beaches

Loggerhead Turtle

Loggerheads occur in subtropical and temperate waters across continental shelves and estuarine areas in the Atlantic, Pacific and Indian Oceans. Throughout this range, loggerheads spends most of their time in nearshore and inshore waters, sometimes associated with reefs and other natural and artificial hard substrates. Loggerheads are highly migratory, capable of traveling hundreds to thousands of kilometers between foraging and feeding areas. Female loggerheads do not appear to migrate to just one foraging area. Rather, they move continuously and thus appear to forage at a series of coastal areas.

www.epa.qld.gov.au

Loggerhead Turtle

Flatback Turtle

Flatback turtles measure approximately 90 cm as adults, and can be distinguished by their flattened carapace. They are olive grey and have four costal scutes with thick, overlapping carapace scales. Females are larger than males and have a shorter tail. Flatback turtles are tropical, found only in the coastal waters surrounding Australia. Their range extends from north Western Australia to Mon Repos, Queensland. They are rarely found in the open sea.

The nesting peaks are in November and December, with mating occurring in waters surrounding the nesting beaches. The flatback may be the only sea turtle that does not have an early pelagic stage; hatchlings probably stay within tens or hundreds of kilometers of natal beaches, where they inhabit protected coastal areas. Flatback turtles are carnivorous, feeding in shallow, turbid inshore waters between five and twenty meters in depth. Their diet is poorly documented, but is known to include sea cucumbers, prawns, jellyfish, sea pens, soft corals, mollusks, bryozoans, and other invertebrates. The diet of hatchlings remains unknown.

Flatback Turtle www.members.iinet.au

Kemp's Ridley Turtle

Kemp's ridley has a relatively restricted range, occurring in the neritic zone of the Gulf of Mexico and western Atlantic. Evidence has showed that Kemp's ridley is a neritic migrant that swim along the U.S. and Mexican coasts, nearshore in continental shelf waters. Narrow migratory corridors extend along the entire U.S. and Mexican gulf coasts.

Reproductively mature females undertake annual migration from the western Atlantic and Gulf of Mexico to their principal nesting beach, Rancho Nuevo, located near the central Mexican gulf coast in the state of Tamaulipas. Females aggregate nearshore Rancho Nuevo in advance of the nesting season. After the nesting season, females begin post-nesting migrations away from their nesting beach, traveling north or south along the coast. Post-nesting migrations have been recorded as far south as Colombia and as far north as Virginia. However, most kemp's ridleys migrate to areas concentrated between north Texas coastal waters and Campeche, Mexico. These long-distance migrations encompass hundreds of kilometers and occur primarily in shallow water of less than 50 m deep.

Kemp's Ridley Turtle

SEA TURTLE DISTRIBUTION IN SOUTHEAST ASIA

Six of seven species of living sea turtles in the world were confirmed to nest or inhabit the Southeast Asian waters. These are leatherback (*Dermochelys coriacea*), green turtle (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*) and flatback turtle (*Natator depressus*). All these six species are commonly found in the Southeast Asian waters except for the flatbacks which are found in eastern Indonesia. The flatbacks are known to nest in Australia but the foraging areas are in the Indonesian waters. The occurrence of sea turtle nestings in the Southeast Asian nations is shown in the Table 1 below. Indonesia has the most species of sea turtle compared with other countries in the region.

Table 1. The occurrence of Sea Turtles in Southeast Asian Countries

Country	Leatherback	Green	Hawksbill	Loggerhead	Olive Ridley	Flatback
Brunei DS	X	X	X		X	
Cambodia	X	X	X	X	X	
Indonesia	X	X	X	X	X	X
Malaysia	X	X	X		X	
Myanmar	X	X	X	X	X	
Philippines	X	X	X	X	X	
Thailand	X	X	X	X	X	
Vietnam	X	X	X	X	X	

All these species are highly migratory, often passing through territorial and international waters from foraging to nesting ground and back again. The turtles are likely to come from an area within a radius of 2,500 km around the nesting area. It was reported that a tagged leatherback from Irian Jaya was recovered in Cebu, the Philippines. The sites of tagging and recovery are separated by some 1900 km. Green turtles that were satellite tracked from Pulau Redang, Terengganu had migrated to the South China Sea and Sulu Sea areas. In addition, satellite tracking of green turtle nesting in the Sarawak and Sabah Turtle Island and some from Thailand also swam to the Sulu Sea. Additional studies of satellite-tracked hawksbills revealed movement of great distances, over 1,000 km. Since these animals transcend national boundaries, they are shared resources among the countries. Thus, the countries in the region have a common responsibility and ownership of a particular population.

Leatherback Turtle

The leatherback turtle is one of the largest marine reptiles alive today. The heaviest known specimen recorded up to 585 kg. The leathery-covered carapace distinguishes it from other hard-shelled turtles. The adult female nesting in Terengganu, Peninsular Malaysia with an average of 162.4 cm curved carapace length. Oceanic distribution of the leatherbacks may reflect the distribution and abundance of macroplanktonic prey. The main diet for the leatherback is primarily cnidarians (Jellyfish and siphonophores). The leatherback turtle is known to nest primarily on the beaches of Terengganu, Malaysia and northwest Irian Jaya, Indonesia. The major rookeries in Malaysia are found, particularly at a 1.5 km stretch of beaches of Rantau Abang and Paka, Terengganu and on the beach of Chendor, Pahang. In the 1950s, about 2,000 females per year were found nesting but the numbers dropped drastically. In 1994, only 213 nests were recorded at Rantau Abang's rookery. Nesting season of leatherback turtles is from March to September each year and the peak is between June and July. No report has been made about the nesting of leatherback turtles on the west coast of Peninsular Malaysia.

The leatherback turtles are also confirmed to nest on the Andaman Sea coast of Thailand but the population status is unknown. In Indonesia, leatherbacks are found in South Sulawesi, Maluku and northern Irian Jaya. In the Philippines, leatherbacks were reported to nest on the Quiniuban Island group, northeast of Palawan. A number of sightings and stranded leatherbacks were also reported from Hinunangan, Southern Leyte and Sinnuangan, Tubay , Agusan del Norte. In Vietnam, the leatherbacks are distributed in the sea areas of Do Son District, Hai Phong City; Khanh Hoa Provjnce; Phu Quoc Island in Kien Giang Province; and also the Con Dao archipelago in Sa Ria -Vung Tau province.

Green Turtle

The green turtle is distinguished from other sea turtles by a single pair of prefrontal scales, four pairs of lateral scutes and five vertebral scutes. The carapace is broad, low and heart-shaped. It is smooth, without keels and scutes are placed side by side. The shell color is light to dark brown. The plastron is whitish to yellowish. The male green turtle has a single claw, which is markedly enlarged and strongly curved. Clutch size averages 104 eggs. Reproduction is seasonal but extended throughout the year at several areas. In Terengganu, Malaysia and Khram Island in Thailand the peak is between May to August, while in Turtle Island Sabah the peak nesting period is from July to October. The main diet for the green turtles is algae and sea grasses.

The green turtle is by far the most extensively distributed sea turtle species in the Southeast Asian region. This species is known to nest on beaches of all countries of the region. In Peninsular Malaysia, the major nesting sites are found on Pulau Redang, Paka and Geliga in Terengganu. Chendor is the main green turtle rookery in Pahang; even though nestings are also reported on the offshore islands and other remote beaches at Pekan and Rompin. The population at Pantai Segari in Perak constitutes the only significant nesting aggregation along the west coast of the peninsula.

In East Malaysia, the green turtle nestings are concentrated on the Sarawak Turtle Island of Talang Talang Besar, Talang Talang Kecil and Satang Besar and Turtle Island of Sabah (Pulau Bakkungaan kecil, Selingaan and Gulisan). The annual nesting of green turtles in Malaysia is estimated around 15,500. The populations from all nesting sites have shown declining trends.

In the Philippines, major nesting sites are on the Turtle Islands (Tawi Province), a group of islands shared with Sabah in the Southern Sulu Sea (Selingaan, Gulisan and Bakkungaan Kecil) and abut 80% of nestings occurred in these areas. The population of nesting green turtles in Turtle Island is estimated to be about 2,500. The green turtles are also reported to nest on Calauit and Matanubong Islands off Palawan.

The principal nesting site in Thailand is on the east coast (Gulf of Thailand) especially at Ko Khram. Nesting of green turtles were also reported in the west coast from the Province of Satun, Phuket and Phangnga. In 1993, a total of 128 nests of green turtles were reported from the Andaman Sea nesting sites.

Green turtles commonly found around the coastline of Indonesia. Nestings were reported from 10 provinces; but the status of the population size is still unknown. In Vietnam, the main nesting locations are Hon Bay Canh and Hon Tre Lon Islands and the nesting season occurs from April to November. The peak season is between May and August period. The present status of the population is still unknown.

Hawksbill Turtle

Hawksbills are distinguished from other sea turtles by two prefrontal scales, thick posterior overlapping carapace scutes, four pair of coastal scutes, the anterior-most not in contact with the nuchal scute, and two claws on each flipper. The carapace is typically serrated along the posterior margins. The head is relatively narrow, the beak tapers to a point and the maxilla projects slightly beyond the mandible. Adult males are distinguished by a long, thick tail that extends well beyond the carapace margin and well-developed, recurved claws on the fore flippers.

Nesting is seasonal, but the season is often expanded. In few localities, nesting may occur throughout the year with one or two peaks. In Thailand, for example peaks are reported in February to April and June to July. Incubation is generally 50 to 70 days in the west coast of Peninsular Malaysia. Hawksbills forage on coral reefs of the offshore islands and these turtles consume a variety of food but specialize on sponges. Historically, major hawksbill concentrations have been located in Southeast Asia. Hawksbill numbers have greatly declined since the hawksbill nesting may not receive the same attention in areas with high green turtle nesting density. The highest concentration of hawksbill turtles in Peninsular Malaysia is found in Malacca. The major nesting sites in the state are Pulau Upeh, Kuala Linggi and Tanjung Bidara. Hawksbill may also be found in Terengganu, Pahang and the offshore islands of Johor. The distributions of hawksbill turtles in East Malaysia are concentrated on the turtle islands of both Sarawak and Sabah. Turtle Islands in Sabah are believed to be the most significant hawksbill nesting sites in Malaysia with about 600 nests annually. A total of 4,933 clutches of hawksbill were recorded in the period from 1982 to 1992. Generally, the peak of nesting season for hawksbill in Malaysia is from March to June every year.

In Thailand, nesting occurs on both east and west coast as well as on some offshore islands, namely Ko Klang, Ko Kra; Pattani Province, Songkla Province and Narathiwat Province. The main rookeries on the east coast (Gulf of Thailand) are Ko Kut, Ko Chang and Khram Islands. The existing nesting populations size is estimated to be 100 nests annually.

The hawksbills occur widely with low nesting densities throughout the Philippines. No major nesting aggregations have been identified but the hawksbills are found to nest in small numbers on numerous islands. Hawksbills are mostly found along the western, eastern and northern coasts of Sumatra (especially Batu Islands), northern and southern Java, north of Nusa Tenggara, southern and northeast Sulawesi, Maluku, southern Kalimantan and north of Irian Jaya. Meanwhile, in Vietnam the nesting areas for hawksbills are on the Con Dao National Park Islands and the size of the population is not known.

Olive Ridley Turtle

The olive ridley is a relatively small sea turtle with six to eight and occasionally five or nine pairs of lateral scutes. The carapace is uniform olive in colour. The head is relatively large compared with green and hawksbill turtles. Male olive ridley have a long tail with heavy terminal nail. Adult females weigh from about 35 to 45 kg. The curved carapace length is in the range of 40 to 70 cm.

In Peninsular Malaysia, most nesting occurs between February to August and the peak is from May to July. In contrast, nesting occurs between October to February in Phuket, Thailand. The number of eggs laid per clutch ranges from 50 to 110. Hatchlings emerge from the nest after about 45 to 65 days and most hatchlings emerge at night. The non-nesting range presumably reflects the availability of food. Olive ridleys are carnivores, feeding primarily on mollusks, fishes, jellyfishes and crustaceans.

In Malaysia, information on the nesting status of this species is fragmentary with records available only for Terengganu, Pahang, Perak and Pulau Pinang. Major nesting sites in Terengganu are Kuala Baru, Telaga Papan, Pulau Kapas, Dungun, Paka and Geliga. In Perak and Pulau Pinang, the nesting sites are Pantai Segari and Pantai Keracut in respective states. Nesting has also been recorded in the Turtle Islands of Sarawak and Sabah. The peak period of nesting season for this species in general is from February to May.

In Thailand, nesting sites of olive ridley are on the coast of the Andaman Sea, especially along the west coast of Phangnga and Phuket Province and the adjacent islands. The population size had declined from 238 in 1979 to 77 nests in 1993. A small population of olive ridley is also located in Trang Province. Olive ridleys are not a common sea turtle found in the Philippines. Sightings of olive ridleys were recorded from the waters off Palawan and Metro Manila. Most recently olive ridleys were reported to nest in the former US Naval Base in Subic Bay, Sambales. Meanwhile, in Indonesia, olive ridleys were confirmed to nest in Pantai Padang in Padang, Bengkulu, Nusa Kambangan in Central Java, Sukamade in East Java, Paloh in Kalimantan, Bualu in Bali and Pantai Utara Kepala Burung in Irian Jaya.

Loggerhead Turtle

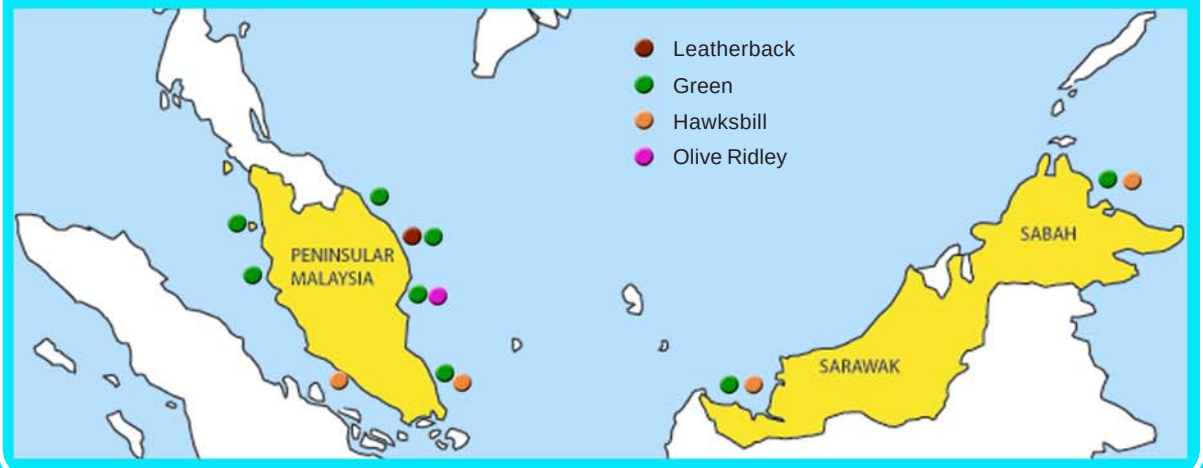
Loggerhead is characterized by typically five pairs of lateral scutes, the anterior-most one touching the cervical, ventral scutes broader than long and three poreless inframarginals on bridge. The carapace is red dust-brown. The head is comparatively large. Two claws occur on the forelimbs, males have thick tails extending beyond the edge of the carapace. Adults generally weight 80 to 150 kg. Mating often takes place in adjacent waters to nesting beaches. The loggerheads reach maturity at the age of 12 to 25 years. The range of migration for loggerhead in this region is more toward Southern Pacific covering Indonesia, Philippines, Eastern Australia, Solomon Island, Papua New Guinea and New Caledonia.

Within Asia, large nesting concentrations of loggerheads are outside the ASEAN countries, in Australia and Japan. Normally, loggerheads nest on temperate beaches. In Sarawak, Malaysia loggerheads were reported to nest in small numbers. In Peninsular Malaysia, the occurrence of loggerhead was not mentioned. Loggerhead turtles are encountered on beaches of South and Central Sulawesi and Ambon Island in Maluku. In the Philippines, the most recent discoveries of loggerheads were from Satan Island and Albay. In Vietnam, they are distributed from the Central Sea area of Vietnam (provinces of Quang Ngai, Sinh Dinh, Khanh Hoa, Ninh Thuan, Sinh Thuan, and Vung Tau) southward to the South Sea area (Phu Quoc Island Con Dao archipelago and Truong Sa Archipelago) and the Gulf of Thailand. This used to be a very commonly-seen species with the highest numbers of the turtles in Vietnam.

Flatback Turtle

The flatback is a close relative of the green turtle, distinguished by its smaller size and flatter carapace. The flatback is only found in northern Australia and northwest Irian Jaya. The flatback turtle is endemic to the Australian continental shelf. Flatback nesting concentration occurs throughout Australia. The feeding area extends to Papua New Guinea and Irian Jaya.

Sea Turtle's Distribution in Malaysia



Distribution of Leatherback Turtles Worldwide

Distribution of Green Turtles Worldwide

Distribution of Hawksbill Turtles Worldwide

Distribution of Olive Ridleys Turtles Worldwide

Distribution of Loggerhead Turtles Worldwide

Distribution of Flatback Turtles Worldwide

Distribution of Kemp's RidleyTurtles Worldwide