

Sea Turtles of Coastal Odisha

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TURTLES IN THE ANIMAL KINGDOM

The Planet earth is beautiful, colourful and magnificent because of the availability of life support entities like air, water, and soil. Therefore, planet earth is vibrant and more specifically supportive for the existence of plants (flora) and animals (fauna). The beauty of earth is, no doubt, biodiversity. If we look at the faunal kingdom, vertebrates are highly amazing due to their feature, colour, texture, behaviour, and nature. As per the evolution and emergence of animals the sequential diversification of vertebrates starts from fishes from water. Gradually, other vertebrates like amphibians (frogs and foods), reptiles (snakes, lizards etc.), birds (all varieties of birds) and mammals (man, tiger, cow, goat, elephant, whale, dolphin etc.) have been evolved during the different time period of geological time scale of the earth. Interestingly, all the stated vertebrate groups have never been evolved over night. It has taken several million years for the animals to appear on the earth. In fact, before animals on the earth, plants were evolved from which animals got opportunity to get oxygen from plants for survival. This is how both plants and animals were seen on the earth.

EXISTENCE OF TURTLES

Turtles are reported to have been available on the earth long long before the “golden period of reptiles”. Reptiles (Latin, *reptus*, - past participle of *reperere* meaning to crawl) are animals which appeared during Triassic, Jurassic, and Cretaceous periods of Mesozoic era. Jurassic period was dominated by large reptiles like dinosaurs (Gr. *deinos* - large or gigantic; *sauro* - reptile) and were moving like kings on the earth. The structure, feature, and behaviour were evidenced from the beautiful movie named “Jurassic Park”. Since then, varieties of life forms have come and vanished because of several reasons. Although turtles are very old on the earth, but still then they have managed themselves to exist and survive successfully on the earth.

In fact, which animals are reptiles ? The class Reptilia of vertebrate group of animals includes following categories of animals.

- (1) Turtles
- (2) Tortoises
- (3) Crocodiles
- (4) Alligators
- (5) Snakes

(6) Lizards

(7) Tuatara lizards (*Sphenodon*)

(8) Dinosaurs

Of these, all except dinosaurs are existing on the earth. Since gigantic reptiles like dinosaurs vanished from the earth, these are regarded as “extinct reptiles”.

LIFE SPAN OF TURTLES : NATURE’S BLESSING

Among all the observed and stated reptiles on the earth, turtles and tortoises occupy altogether a different status as far as longevity is concerned. These are some of the most long lived creatures of the reptilian group. Even small species of reptiles that are typically kept as pets such as box turtles and terrapins live between 30 to 40 years if maintained properly in captivity. Large species like sea or marine turtles are estimated to live for about 80 (eighty) years. Interestingly enough, the giant tortoise, the largest of all land turtles, typically survives at least one hundred years. Some have been reported to have survived even for more than 200 years.

The reason for their long survival or a long life span is believed due to their slowness. One unique feature of turtles is the slow and continuous growth throughout the life. This prevents these slow creatures from aging and long survival. So, because of slow metabolism, they are believed to serve for a very large period in comparison to other faunal diversity on the earth. Therefore, turtles and tortoises are noticed in many freshwater ponds, ditches, rivers, streams, lakes, and sea. They are observed to survive for a long period even without food and water. This is the critical and astonishing aspect of these long lived animals of our nature.

SIGNIFICANCE OF TURTLES IN CULTURE, TRADITION, MYTHOLOGY AND FOLKLORE

Chelonians comprising turtles, tortoises, and terrapins are ancient reptilian fauna in evolutionary history. **The turtle is a symbol of wisdom, knowledge, and is able to defend itself on its own. It symbolizes peace, calmness, composed and steady behaviour. It personifies water, the moon, the Earth, time, immortality, and fertility. Creation is very much linked and associated with the tortoise and it is also believed that the tortoise bears the burden of the world.**

In Odissi dance, specifically in “Dasavatar Dance” (Dance with 10 incarnations), the turtle comes to pictures as gradual evolution on the earth. The first incarnation is fish and turtle being the second one. The turtle has a crystal clear position as a symbol of steadfastness and tranquillity in religion, mythology, and folklore from around the world. From the long life span (longevity), it appears that possibly its shell is responsible to protect it from foes around it. Moreover, this species do not have any other protective defensive or offensive measures or structures. Well protective body structured with perfect architecture of the external shell is an excellent device for successful survival.

The term turtle (in Odia is Kachhapa) or “Kashyapa” is stated in Vedas and certain other Vedic texts. In one of several cosmology related hymns of Atharvaveda of around 1,000 BC, it is described as below.

As per Hindu mythology, Vishnu, (the God who is believed to be rearer) was reincarnated as “Kashyapa”, a turtle shouldering the burden of the world on its back (Fig. 1).

The Atharvaveda describes as follows.

"Undisturbed I am, undisturbed my soul,
undisturbed mine eye, undisturbed mine ear,
undisturbed is mine inbreathing, undisturbed is
mine outbreathing
undisturbed my diffusive breath, undisturbed
the whole of me."

– Atharvaveda, Book XIX, Hymns L51 - 53.



Fig.1 Lord Vishnu in "Kashyapa" avatar.

Turtles are frequently depicted in popular culture as easygoing, patient, and wise creature. Due to long life span, slow and sluggish movement, sturdiness, and wrinkled appearance, they are an emblem of longevity and stability in many cultures around the world. In the whole animal Kingdom, the turtle is regarded as the best and finest peaceful creature in culture and nature. It is described and cited in different religions also.

In Judaism, according to Torah Leviticus 11, the turtle is considered dirty and cannot be eaten. In Sufism, the hatching and return of baby turtles to the sea is a symbol of returning to God through God's guidance and supervision, The Quranic verses related to turtles state "Extol the name of your Lord, the highest who has created and regulated, and has destined and guided".

The early Christian scholar St Jerome recounted that the tortoise moves sluggishly because it is "burdened and heavy with its own weight" signifying the grievous sin of the heretics." An early Christian curse tablet has been found that addresses "the most unclean spirit of a tortoise". In art, turtles and tortoises were depicted as the embodiment of evil in combat.

The Turtle is also placed in sports. The athletic teams of the university of Maryland College Park are known as the "Maryland Terrapins" (often shortened to "Terps") and compete at the highest level of collegiate athletics in the United States. The school mascot is an anthropomorphic diamond back terrapin named "Testudo" (named after the scientific or zoological or Latin name for tortoise).

TURTLES IN LITERATURE

The turtle house by the German architect and designer Kurt Voltzke at El Gouna is a unique structure to be witnessed. Apart from these, turtles are also described in many literature. some examples are enlisted below.

- (i) Shaman King's novel "The Back of the Turtle" (2014)
- (ii) Stephen King's Book or "The die Dark Tower Series" (2017)
- (iii) Lewis Carroll's Book or "Alice's Adventures in Wonderland" (1865)

- (iv) Beatrix Potter's Book "The Tale of Mr Jeremy Fisher" (1966)
- (v) Holling C Hollings' Book "Minn of the Mississippi" (1951)
- (vi) Dr Seuss' Book "Yertle the Turtle and other Stories" (1958)
- (vii) Virginia Hamilton's Book "The People Could Fly" (1985)
- (viii) Paulette Bourgeois's Book "Franklin in the in Dark" (1986)
- (ix) Roald Dahl's Book "Esio Trot" (1990)
- (x) Joseph Bruchac's Book " 13 Moons on Turtle's Back" (1992)
- (xi) Marion Dane Bauer's Book "A Mama for Owen" (2007)
- (xii) Jerry Pinkney's Book "The Tortoise and the Hare" (2013)
- (xiii) Michael Ende's Book "Momo" (1973)
- (xiv) Michael Ende's Book "The Never Ending Story" (1979)
- (xv) John Stinbeck's Book "The Grapes of Wrath" (1939)
- (xvi) DH Lawrence's Books "Tortoises" (1921)
- (xvii) Barbara Kingsolver's Novel "The Bean Trees and Pegs in Heaven"(1993)
- (xviii) Terry Prachett's Novel "Discworld"
- (xix) Leanne Betasamosake Simposon's Book "Dancing on our Turtle's Back" (2011)

In the literature, some characters of turtles are explained vividly by some authors (Table 1).

Table 1 Characters of turtles by some authors

Author	Origin	Character
JRR Tolkein	The Adventures of Tom Bombadil	Fastitocalon
Paulette Bourgeois	Franklin the Turtle	Franklin
Terry Pratchett	Discworld	Great A'Twin
Michael Morpurgo	The Wreck of the Zanzibar	Leather back Turtle

BIOGEOGRAPHY AND PHYSIOGRAPHY OF ODISHA

Odisha is having unique biogeographic features, which supports a large diversity of animals. Being situated in the east coast of India, the physiography of the state is the amalgamation of different biogeographic provinces like (i) Chhotanagpur Plateau, (ii) Eastern Highlands, (iii) Lower Gangetic Plain, and (iv) Eastern Coastal Plain. The distribution and composition of the state is the diffusion of Indo-Malayan and AfroMediterranean biota. The geographical area of the state is 1,55, 707 square kilometres and it represents 4.74% of the total geographical area of the country. The condition of the forest is mostly deciduous with some area of semi-evergreen forest along with mangrove forest along the coastal belt. The bio- geographic provinces offer a congenial and comfortable ecogeographic and climatic ambience to support a large diversity of floral and faunal life.

The coastal region is the combination of several deltas formed by the major rivers of Odisha namely Subarnarekha, Budhabalanga, Baitarani, Brahmani, Mahanadi, and Rushikulya. Due to appropriate supply of perennial freshwater, the state enjoys many reservoirs, lakes, rivers, and streams which serve as ideal habitats for freshwater turtles. Many species of turtles are also

inhabitants of forests, hill streams, and stagnant water bodies like ponds and ditches. The important aquatic bodies providing ideal habitats of turtles are stated below.

The rivers which pass and flow through Odisha in to Bay of Bengal can be broadly categorized into four groups. In fact, this is according to the sources.

- (i) Rivers that have source outside the state, i.e., the Subarnarekha, the Brahmani, and the Mahanadi.
- (ii) Rivers having a source inside the state, i.e., the Budhabalanga, the Baitarani, the Salandi, and the Rushikulya.
- (iii) Rivers having a source inside Odisha, but flow through other states, i.e., the Bahuda, the Bansadhara, and the Nagavali.
- (iv) Rivers having a source inside Odisha, but tributary to rivers which flow through other states, i.e., the Machakund, the Sileru, the Kolab, and the Indravati.

Apart from freshwater habitats of freshwater turtles in Odisha, mass nesting called “arribada” of Olive Ridley sea turtles in Gahirmatha, Devi, and Rushikulya mass nesting rookeries are the most spectacular feature of the sea coast. Odisha is one of the four maritime states in India bordering the Bay of Bengal along the East Coast. The state enjoys a coastline of about 480 Km (8.0% of the total Indian coast line) and stretches from the Udayapur village bordering West Bengal in the north and to the marshes of Ichhapuram and Bahuda estuary bordering Andhra Pradesh in the south. The coastline embraces six districts of Odisha such as Balasore, Bhadrak, Kendrapara, Jagatsinghpur, Puri, and Ganjam. The coastal

plain of Odisha is called the “Hexadeltaic Region” or the “Gift of Six Rivers”. The Mahanadi delta system is the largest one and the smaller delta is Rushikulya river.

Odisha is proud of both fresh water and marine water turtles. The sea turtles in Odisha have drawn the attention because of unique coastal geography, virgin land, and texture of sand particles of sea beach.

TURTLES OF ODISHA

The living turtles and tortoises (Extant Chelonians) of the world comprise 352 species under 14 different families. Because of ecological problems and anthropogenic pressure towards the environment, nine species and one sub-species of chelonians have already become extinct by 1,500 AD. Chelonians are basically divided into two major groups namely (i) Side-Necked Turtles (Pleurodires) and (ii) Hidden-Necked Turtles (Cryptodires).

Three of the 14 families belong to the Pleurodires which are generally found in South America, Africa, Madagascar, and Australia. The Cryptodires can further be classified into marine, terrestrial, and freshwater turtles. In India, about 34 species of chelonians are known to inhabit the land and coastal waters. These include five species of sea turtles representing two families of Cheloniidae and Dermochelyidae, four species of the family Testudinidae and around 25 species, chiefly freshwater ones, of families Trionychidae and Geomydidae.

The chelonians of Odisha is represented by 17 species including four species of migratory marine turtles (Family: Cheloniidae and Dermochelyidae) five species of hard shelled freshwater terrapins (Family Geomydidae), and six species of soft-shelled freshwater turtles (Family Trionychidae) and two species of the land tortoises (Family Testudinidae) (Table 2).

Table 2 Turtles and tortoises of Odisha belonging to the order Chelonia

Sl. No.	Name of the family	Biological name of the species
1.	Geomydidae	1) <i>Batagur baska</i> (Gray 1831) 2) <i>Melanochelys trijuga indopeninsularis</i> (Anandale, 1913) 3) <i>Melanochelys tricarinata</i> (Blyth, 1856) 4) <i>Pangshura tecta</i> (Gray, 1831) 5) <i>Pangshura tentoria</i> (Gray, 1834)
2.	Cheloniidae	6) <i>Chelonia mydas</i> (Linnaeus, 1758) 7) <i>Eretmochelys imbricata</i> (Linnaeus, 1766) 8) <i>Lepidochelys olivacea</i> (Eschscholtz, 1829)
3.	Dermochelyidae	9) <i>Dermochelys coriacea</i> (Vandelli, 1761)
4.	Testudinidae	10) <i>Geochelone elegans</i> (Schoeff, 1795) 11) <i>Indotestudo elongata</i> (Blyth, 1854)
5.	Trionichidae	12) <i>Nilssonina gangetica</i> (Cuvier, 1825) 13) <i>Nilssonina hurum</i> (Gray, 1831) 14) <i>Nilssonina leithii</i> (Gray, 1872) 15) <i>Pelochelys cantorii</i> (Gray, 1864) 16) <i>Chitra indica</i> (Gray, 1831) 17) <i>Lissemys punctata punctata</i> (Bonnaterre, 1789) 18) <i>Lissemys punctata andersoni</i> (Webb, 1980)

According to the reported literature, there are about 180 species of freshwater turtles, 62 species of land turtles, and 07 (seven) species of sea turtles in the world. Out of these, 11 species of freshwater turtle, 02 (two) species of land turtle, and 04 (four) species of sea turtles are known to occur in Odisha. Furthermore, in Berhampur Forest Division, 03 (three) species of freshwater turtle, 01 (one) species of land turtle, and 03 (three) species of sea turtles are known to occur.

GENERAL CHARACTERISTICS OF TURTLES

Turtles are characterised by the following characteristics.

- (1) All turtles are reptiles. They are third category of vertebrates next to fishes and frogs.
- (2) Sea turtles live and swim in the ocean. Terrapins spend time both on land and in water. They live in brackish water and often in swampy areas. Tortoises live on land.
- (3) Most terrapins, freshwater turtles, and tortoises can pull their head and feet into their shells. In fact, they behave like this when they are apprehensive of danger and attack or enemies.
- (4) Their body is not streamlined like fishes. Most terrapins and freshwater turtles along with tortoises can pull their head and feet into their

shells due to escape from danger or enemies. Sea turtles cannot pull their heads, flippers or tail into their shell.

(5) The whole body is covered by hard covering. The dorsal covering (carapace) covers the dorsal side whereas the ventral side (plastron) covers the lower or belly side. Both coverings are known as exoskeleton or shell. This shell protects the soft parts of the body.

(6) No living turtles possess teeth and skull.

(7) Most turtles excepting softshell turtles and leatherback turtles have horny scales covering the shell. These scales help in identifying the species.

(8) Turtles have an extensive behavioural repertoire. Many are social, bask under sunlight or feeding in groups.

(9) Several turtles are known to produce sounds, especially during courtship including grunts, gasps, bellows, and even chicken like clucks. When threatened, some produce deep hiss. Others growl or croak like frogs and toads.

(10) Sea turtles are highly aquatic, some are migratory and in general these are adapted for swimming. The forelimbs are characterised by flippers which are modified and look like the wings of birds through the fusion of digits. The more aquatic turtles exhibit extensive webbing on their feet, while the terrestrial turtles lack webs.

(11) All turtles lay eggs (oviparous) like fishes, amphibians, other reptiles and birds.

(12) For most species of turtles, sex (male or female) is determined by the temperature of incubation of eggs. No parental care is observed after laying of eggs.

(13) The hatchlings of the turtles and most other aquatic turtles scramble towards the water immediately after emergence.

(14) Turtles are seasonal breeders, but some species like the flap shell turtles are seen to breed throughout the year.

(15) Turtles show sexual dimorphism or sexual size dimorphism (SSD), although females are larger than males in the majority of species.

(16) All turtles lay eggs on land except the Northern long-necked turtle (*Chelodina rugosa*) from Australia which lays eggs under water.

(17) All species of sea turtles are long lived, slow growing feature, and characterised by a complex life cycle.

(18) The sexual maturity in sea turtles is delayed in all species.

SEA TURTLES OF ODISHA

In Odisha, coastal zone embraces 3 (three) species of freshwater turtles, 1 (one) species of land turtle, and 3 (three) species of sea turtles. More clearly, Berhampur Forest Division, Ganjam having the coast line of 54 km from North at Prayagi to south at Patisonpur near Andhra Pradesh border is very congenial for all those three species of marine turtles namely as follows.

(1) Hawksbill sea turtle

(2) Green sea turtle

(3) Olive Ridley sea turtle

(1) HAWKSBILL SEA TURTLE

Hawksbill sea turtle is named so because these turtles have a mouth which is as like as a beak hawk (Fig.2). The biological or scientific name of this species is *Eretmochelys imbricata*.

It is one of the smaller sea turtles which is usually of two to three feet long and weighs around 90 kg. Head is narrow and bears two pairs of scales in front of its eyes. Jaw is not serrated. Carapace is bony without ridges and has large overlapping scales (scutes) along with four lateral scutes. Carapace is elliptical in shape. Flippers have 2 claws. The carapace is orange, brown or yellow and hatchlings are mostly brown with pale blotches on scutes.

They feed on sponges, anemones, squids, and shrimps (carnivorous in nature). These are mostly distributed on and around coral reefs of the sea bed. They are mostly distributed in the tropical and subtropical waters of the Atlantic, Pacific, and Indian Oceans. They nest at intervals of two to four years and nest between 3 to 6 times per season. Egg laying ranges an average of 160 eggs in each nest. Eggs incubate for about 60 days.

This species is enlisted as “Endangered” (in danger of extinction within the foreseeable future) in 1970 under the US Endangered Species Conservation Act, the predecessor to the US Endangered species Act, established in 1973. This is the status at US level. But, internationally it is listed as “Critically Endangered” (facing an extremely high risk of extinction in the wild in the immediate future) by the International Union for Conservation of Nature and Natural Resources (IUCN).

The greatest threat to hawksbill sea turtle is the harvesting for their attractive prized shell, often referred to as “tortoise shell”. In some countries, the shell is still used to make hair ornaments, jewellery, and varieties of other decorative items including hair combs.

(2) GREEN SEA TURTLE

The green sea turtle (*Chelonia mydas* is the scientific name), also known as the “green turtle”, “black sea turtle” or “Pacific green turtle”, is a species of large sea turtle. Its range extends throughout tropical and sub tropical seas around the world with two distinct populations in the Atlantic and Pacific Oceans, but it is found in the Indian Oceans. The common name refers to the usually green fat found beneath its carapace, not to the colour of its carapace, which is olive to black. The dorsoventral flattened body is covered by a large, teardrop-shaped carapace. It has a pair of large paddle-like flippers. It is usually light coloured, although in the Eastern Pacific populations, parts of the carapace can be almost black (Fig. 3).

Green sea turtles are mostly herbivorous. The adults usually inhabit shallow lagoons, feeding mostly on various species of sea grasses. The turtles bite off the tips of the blades of sea grass, which keeps the grass healthy. Most individuals weigh about 136 to 181 kilogram and some even can be as heavy as 200 kilogram. They spend most of their lives underwater, where they can rest for up to five hours at a time before coming up for air. When active, they typically alternate between being underwater for a few minutes and coming up to the surface to breathe air for a few seconds. These turtles also sunbath on land. They have strong paddle like flippers that help propel them through the water,

Green sea turtles migrate long distance between feeding grounds and hatching beaches. Many islands worldwide are known as “Turtle Island” due to green sea turtles nesting on their beaches. Those that reach maturity may live up to 80 years in the wild. This species is listed as “Endangered” by the IUCN and CITES and is

protected from exploitation in most countries. In some countries, turtles and their eggs are still hunted for food. Many turtles die after being caught in fishing nets. In addition, real estate development often causes habitat loss by eliminating nesting beaches.

Mating behaviour is similar to other marine turtles. Female turtles control the process. After mating in the water, the female moves above the beach's high tide line, where she digs a hole of 11 - 12 inches in depth with her hind flippers and deposits her eggs. The clutch size ranges between 85 to 200, depending on the age of female. This process takes about an hour and a half. The female does this 3 to 5 times in a season. The eggs are round and white measuring about 45 mm in diameter. In around 50 -70 to days, the eggs hatch during the night and the hatchlings instinctively head directly into the water. Each year on Ascension Island in the south Atlantic, green turtles create 6,000 to 25,000 nests. They are among the largest green turtles in the world and, in fact, many are more than a metre in length and weigh up to 300 kg.

(3) OLIVE RIDLEY SEA TURTLE

The Olive Ridley sea turtle (*Lepidochelys olivacea*), also known as the "Pacific Ridley sea turtle", is a species of marine turtles. This name is given because of its olive colour and discover Ridley. This species is the second smallest and most abundant of all sea turtles found in the world. The average length is 2 feet and weight is around 45 kg. Its shell is heart shaped. These are distributed only in warm waters including the southern Atlantic, Pacific, and Indian oceans. The Olive Ridley has a slightly smaller head and smaller shell than Kemp's turtle (Fig. 4). These are found

throughout the world. The life span is estimated to be between 30 to 50 years. They can migrate thousands of kilometres every year, and come together for mass nesting (Arribada).

Female turtles return to the same beach where she hatched, to lay her own eggs. Some species travel vast distance in the 10 to 20 years between hatching and first nest. Biologists opine that sea turtles have the ability to detect the Earth's magnetic field and use it as an orientation cue.

The number of these turtles is greatly reduced due to ever exploitation for turtle meat and eggs. Bycatch in fishing gear and the direct harvest of turtles and eggs are the major threat. These are listed under the "Endangered" Species Act. In the Indian Ocean, three mass nesting beaches occur in Odisha, India namely Gahirmatha, Devi river mouth, and Rushikulya with an estimated more than 1,00,000 (one lakh) nests per year. In fact, Gahirmatha is recorded to be the largest nesting ground of Olive Ridley in the world.

These are omnivorous and have a varied diet which includes salpas, algae, jelly fish, fish, benthic invertebrates, molluscs crustaceans, and bryozoans. They congregate and mate usually during November and December in the coastal water of Odisha. The courtship occurs several weeks before the nesting season. Two or more males may court a single female. Male sea turtles have enlarged claws on their front flippers. These help grasp the shells of the females during mating. The fertilization is internal.

Male sea turtles spend their entire life inside the sea. Since they do not have to return to land to lay eggs, male turtles almost never leave the ocean. The females usually dig a nest as deep

as two feet and lay 70 to 190 eggs depending on their age. After egg laying, they cover the nest with sand, compact it by thumping over it and return to the sea. The whole process takes around 45 minutes to one hour. The selection of appropriate nesting site in a nesting beach is the most crucial part. They only nest if they find most suitable site, otherwise they return without nest which is known as false crawl. They reach sexual maturity at about 15 years of age. When ready to breed, both males and females travel from feeding grounds to breeding sites just off shore nesting beach. Females return to the beach on which they were born to nest. Out of 480 km coastal stretch of Odisha, Rushikulya is the second most preferred mass nesting site for them. The sex ratio in the clutch is governed by the temperature. Temperature lower than 28°C produces males and conditions of 29°C to 30°C produces a mixed clutch of males and females, while at temperature of 31°C to 32°C produces only females. The incubation period lasts for about 45 to 60 days.

Olive Ridleys are Schedule I species under the Wildlife (Protection) Act, and are listed as “Endangered” in the IUCN Red Data Book in the “Appendix-I” of Conventions, on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and also listed Convention of migratory species” (CMS). India, being a signatory nation to all the stated conventions, has the responsibility of protecting this endangered species, its nesting beaches, breeding, feeding, and congregation areas as well as migratory pathways in the sea.

SIGNIFICANCE OF SEA TURTLES

Sea turtles are a fundamental link in marine ecosystem. They help to maintain the

health of sea grass beds and coral reefs that benefit commercially valuable species such as shrimps, locked, and tuna. Sea turtles are the live representatives of a group of reptiles that have existed on the earth and travelled the seas for the last several million years. Moreover, turtles have major cultural significance and ecotourism value.

They maintain balance in aquatic ecosystem as scavengers thereby helping in the release of lowed-up nutrients back to the environment. They also control invasive weeds and are excellent indicators of the health of ecosystem. They have been playing vital roles in maintaining the health of the oceans of the world. These roles range from regulating and monitoring productive coral reef ecosystem to transporting essential nutrients from the oceans to beaches and coastal dunes. Even after advancement of science and technology, very little is known and explored about these primitive innocent creatures possibly because of their concealed marine life. Long migration costs them enormous risks on the way from exhaustion, adverse weather, attack from predators and vast expenditure of energy and sometimes risk of life are the matter of curiosity which needs extensive and elaborative analyses.



Fig.2 Hawksbill sea turtle.

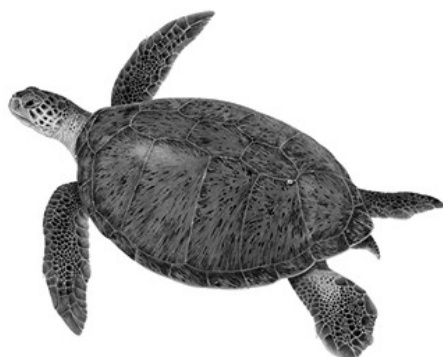


Fig.3 Green sea turtle.



Fig.5 Our future in our hand, head and heart (3H).

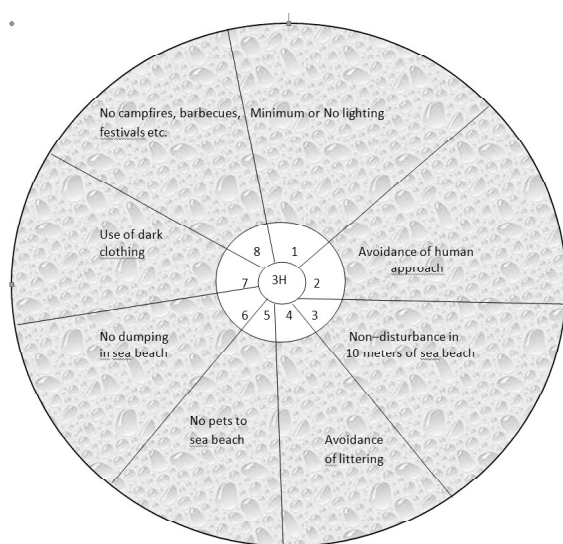


Fig.4 Olive Ridley sea turtle.

CONCLUSION

All the animals of our nature are our hidden treasure and each one is like us. We human beings are leading a healthy life because of existence of both flora and fauna around us. Unfortunately, the declining trend of biodiversity including marine turtles is certainly due to unwanted and undesirable anthropogenic activities. For better survival and population of marine turtles following measures may be taken up (Fig.5).

- (1) Minimum lighting of the sea beach.
- (2) Avoidance of human approach over nesting beach.
- (3) Non disturbance within 10 metres of sea beach which is egg laying place.
- (4) Avoidance of littering nesting site.
- (5) Avoidance of carrying pets in our sea beach.
- (6) Avoidance of putting and dumping structures such as fishing vessels, equipments, vehicles, plastic bottles, and non-biodegradable materials on the sea beach.
- (7) Use of dark dresses or clothings for camouflage.
- (8) Avoidance of campfires, barbecues, festivals etc.

Our nature is our culture and heritage. Indian culture and tradition is unique in the world as far as conservation through worshipping is concerned. This is reflected through respect, love, and offering to sun (source of light, energy, and disinfection), rivers (source of drinking water), temples (source of peace and tranquillity), trees (source of oxygen), animals source of

degradation, ecological balance, harmony, learning etc.) and soil (source of food through plants, trees etc.). Worshipping nature was our daily routine which is now ignored, degraded, and destroyed. That is the reason why unexpected unnatural situation arises which is affecting us tremendously. So,

“Let us protect our nature
for a healthy future without torture.”

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