



STATUS OF *CHELONIA MYDAS* (GREEN SEA TURTLES) AT HAWKE'S BAY, KARACHI, SINDH, PAKISTAN

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ABSTRACT

Chelonia mydas (green sea turtle) is an endangered turtle species and vanishing from oceans at faster pace. In order to check the factors responsible for its elimination a study was conducted to record current status of *Chelonia mydas* as well as its main habitat at "Hawke's bay" Karachi. Several surveys were done in sunset to late night to observe the nesting condition of green sea turtles and problem it faced during hatching. Results of present study demonstrated that high rate of pollution; existence of large number of predators; human encroachment and disturbance at Hawke's bay Karachi are main factors behind the decline of this species. Implementing the conservation efforts and educating the local people is need of time to conserve this species at Hawke's bay.

1. INTRODUCTION

The *Chelonia mydas* (Green Sea Turtle) is one of the largest sea turtle in the world. It ranges in length from 2 to 6 feet with males is larger than females. Their weight is up to 200 kg. Adult females weight is on average 120 kg and males weight just a little more. Their carapace (top shell) can be olive green, brown, or black, depending on geographic location. Their plastron (bottom shell) is yellow. They are called Green Sea Turtles because of the color of their flesh. Their limbs, which are flattened and flipper-like, are used for swimming. *Chelonia mydas* (Green Sea Turtle) hatchlings weight less than 1 ounce and are 5 to 10 centimeters in length. They are black on top and white on the bottom. The *Chelonia mydas* (Green Sea Turtle) is found in warm water, tropical and subtropical oceans in the world. They live in warm, shallow water, where they spend all of their lives. The only time they leave the water, when females come on coast to nest.

These turtles travel hundreds or even thousands of miles to their own hatching grounds to mate and nest [1] they are mating internally in the water just of the nesting beaches. *Chelonia mydas* (Green Sea Turtle) are ubiquitous throughout tropical and sub-tropical waters and have been of conservation concern for decades. Their life-history traits (e.g., long-lived, late maturation, highly migratory) make them vulnerable to anthropogenic impacts on land and at sea. Pakistan has largely known to support the large population of *Chelonia mydas* (Green Sea Turtle) along sand spit beach, Hawke's bay, and Mubarak village. These turtles travel hundreds or even thousands of miles to their hatching grounds to mate and nest [2] they are mating internally in the water just of the nesting beaches. Females put their eggs (in particular places) at night that process takes about 2 hours [3]. *Chelonia mydas* (Green sea turtle) is among the five turtle species which are exists in Pakistan. Green sea turtle is listed as endangered species in IUCN red list [4] Coastline of Pakistan is one of major nesting beaches marked by IUCN at number 16 One of the suitable nesting grounds of *Chelonia mydas* (green

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sea turtle) is Hawke's bay of Karachi coastline. *Chelonia mydas* (Green sea turtle) nests on Hawke's beach and Mubarak village throughout the year. The peak season of nesting starts from August, September to October, Changes globally [5]. They grow from 100 to 150 cm and weigh from 110 to 200 kg. They are distinguished from other marine turtles, because they have a single pair of prefrontal scutes on the head, located in front of their eyes [6] *Chelonia mydas* (Green Sea Turtle) are ubiquitous throughout tropical and sub-tropical waters and have been of conservation concern for decades. All sea turtles immediately move back to oceans after hatching. In most of the time they swim actively to offshore in the early mornings. Selection of nesting site is one of the major component of their life cycle [7] Only five species of sub order Cryptodira of order Testudines are reported to visit Pakistan beaches. Different species use different locations for nesting, like *Chelonia mydas* (Green sea turtle) and Oliver ridley sea turtle use Hawke's bay beach for nesting and Hawk's bill sea turtle, leatherback sea turtle and Kemp's ridley sea turtle use Baluchistan coasts for nesting. The purpose of these Cryptodira species is to maintain homeostasis and biodiversity of the ocean. [8]

2. MATERIALS AND METHODS

Material used during the study are: Camera: Camera was used for capturing eggs, nesting ditches and specimens of *Chelonia mydas* (green sea turtle), Hand torch: It was used to locate the green sea turtles because sea turtles often come out at their nesting places at nights and for viewing the sea turtles often come out at their nesting places at nights and for viewing things we used hand lights, Hand gloves: Hand Gloves were used for safety of eggs that may not get destroyed or damaged, Measuring tape: It was used to measure the different body parts of sea turtle. Hand box: It was used to collect the eggs of *Chelonia mydas* (green sea turtle), Tagging: It was applied to locate the place where eggs were covered in the dust of soil, Magnifying glass: It was used for enlarged image of morphological characteristics of green sea turtle for error free study, Iron digging pipe: This equipment was used to dig the area where sea turtle laid eggs, Long boots: purpose of putting on long boots was to avoid any kind of bite from

crabs, Nets: Nets was used to easily approach green sea turtles for capturing them safely without harming them, and Cotton: Cotton was used for the safe handling of eggs inside the box during hatching of *chelonian mydas* (green sea turtle).

Present study was carried out at Hawke's bay Karachi for observing the nesting behavior of *Chelonia mydas* (Green sea turtles) Altogether 23 surveys were conducted at the study spot during which green sea turtles were observed from sunset to late night. The nesting behavior was recorded during night only, however status of habitat with regard to presence of contaminants was observed during both day and night. Surveys were conducted from August to October, 2019. Sindh wildlife department has established a Turtle conservation unit at Hawke's bay Karachi shown in figure 1.1 Sindh wildlife department helped in collecting the useful information about *Chelonia mydas* (green sea turtle) about their existence, systematic, morphology. Information about habitat of *Chelonia mydas* (green sea turtles) was also collected from the Turtle conservation unit. Hawke's bay is one of the sandy beaches of Karachi coast and spread around 20 km at seashore. Locally, it is known as turtle's beach Sandy profile of Hawke's bay with rocky outcrop made a perfect combination of habitat for green sea turtle to lay their eggs and provide a favorable environment for their nesting. Hawke's bay sands play a very key role in nesting of green sea turtle due to the soil composition, rocky outcrop, ground water level, water marks and slopes.

At the 3 km of study area, the crawl marks of green sea turtles were traced in order to mark the movement of animals in question. They were later sited using the digital cameras. The morphological parameters vary from female to female, though some specimens of *Chelonia mydas* (green sea turtles) were measured for their common morphological parameters such as: Length 58 inches, Width 39 inches, Front flipper length 28 inches, Front flipper width 6 inches, Back flipper length 32 inches, Back flipper width 6.2 inches, Head length 10 inches, Tail length 8 inches, Nest area 3-4 feet (depending on turtle size), Nest depth 4 feet, and Egg count 118/cluster.

All the measurements were done by equipment without harming or disturbing the nest and the eggs. During the counting of nests each nest was marked by a specific number and location as latter on they can be easily accessible. The eggs of green sea turtles were putted in a bucket and bring back them to the hatchery for safe and secure hatchling and to protect them from the predators like dogs and crabs shown in figure 1.2

3. RESULTS AND DISCUSSION

Hawke's bay Karachi is under climatic pressure which leads drastic changes at the beach. Green sea turtle use the Hawke's bay beach to nest within dry line. Most of the nesting is observed in the month of September and peak number is seen in the month of October. There are many changes made by humans.

These factors are vulnerably affecting the nesting activity at the beach. Before the month of September there is no nesting is observed or the number is very negligible. Due to high tides at the beach during the months of July and August there is no nesting is observed which indicates the sand is moist; thus the conditions are not favorable for egg laying process shown in table 1.1 In September there were more than 60 nest observed along the shore. At the Hawke's bay many nests were affected by humans, plastics debris and predators. 27 affected and badly disturbed nests were observed during the nests survey in the month of September at the beach shown in table 1.2

In the second survey at the beach in the month of October the climatic conditions was observed feasible for Green sea turtle nesting because the climatic conditions has been considerable effects on nesting. Highest numbers of nests were observed in the month of October as the nesting period is on peak due to low tides, climatic influence and dry sand shown in table 1.3 there were number of man-made hats, tourism influence and predators which are the risks for green sea turtle to nest at the beach. During the survey it was observed that many nests were occupied by dogs. They are the main reason in decline the egg poaching and reducing the number of nests at the Hawke's bay.

During the survey in the month of August, September and October it was also observed that during the start of September there were only few numbers of green sea turtles observed along the offshore. As gradually the time goes with suitable temperature of the beach sand there was increase in turtle's number which were started visiting and processing egg lying. In the following chart it is mentioned that the number of green turtle were gradually increased at the beach. Start of September showing the less number of green sea turtles, while the end of October showing the highest number of turtles at the time of hatching.

Reproduction is related to sea turtle nesting at the beach. Green sea turtle laying eggs on beach above the high tide because the development of embryos are dependent to sand temperature, climatic conditions and environment of the beach are the important components of the green sea turtle life cycle shown in figure 1.3 All the species of sea turtle have temperature dependent sex determination, with female at high temperatures. During the close study of egg laying area of green sea turtles at Hawke's bay Karachi it has been observed that each turtle lay eggs in between 120 to 150, however the number is varies shown in figure 1.4

Threats to *Chelonia mydas*: Green sea turtle faces wide variety of problems at Hawke's bay Karachi due to their complex life. Climate change has a major factor affecting the habitat of nesting and behavioral changes. During the research, following enlisted things was observed: Behavioral changes in response to climatic changes, Capacity of Green sea turtle to cope with the climatic changes, Development of conservation in response to climatic changes, Conservation of green sea turtle in response of fishing, Impact of tourism at the Hawke's bay, Human barriers and its results on Green sea turtle, Pollution and plastic debris, Predators and eggs poaching of Green sea turtle at Hawke's bay Karachi shown in figure 5.

Conservation status: Green sea turtles are easily susceptible to humans from nesting to egg hatchling, adults to juvenile. Therefore it is very important to place them on top of conservation list of marine taxa. Human psychology and behavior towards conservation play a very crucial role in recovery of

green sea turtle population and reduction in the mortality rate, conservation education to local communities at Hawke's bay and near Mubarak village is very important for the safe recovery of nests and the juveniles. Support for the conservation of green sea turtle and educating the local people is the demand of current surrounding at Hawke's bay for green sea turtle conservation. WWF Pakistan and Sindh wildlife department is working on green sea turtle conservation with their projects and conservation initiatives. Many handful projects started by Sindh wildlife department and currently their work is admirable since they developed the nesting beach hatcheries for the green sea turtle conservation and safe collection of eggs from the nests and sending back the juveniles to offshore after their hatchling. However, it is very important to increase the knowledge of local communities and enhance their conservation skills because their role is very important in collaboration with the wildlife department.

During the survey, based on observation of nesting at the Hawke's bay Karachi. It has been observed that there are many green sea turtles return back to sea without nesting and egg hatchling. During the nesting period it was compared that how much number of turtle started nesting and what number was returned back to sea. The cause of non-nesting is due to plastic, predators, unfavorable climatic conditions; temperature of the sand, high tide and number goes on. During the first observation the climatic and temperature were noted, as temperature effects the juveniles of green sea turtle. During the months of July and August there was no nest observed at Hawke's bay due to high tides that indicate the temperature of sand is low (not favourable for nesting). In September there were more than 65 nests at the area of 3 km alongside the shore. At the Hawke's bay many nests were affected by humans intentionally or unintentionally. 30 effected nests were observed during the survey in the first week of September. The nests were found effected due to plastic pollution and predators like; dogs, crows, skunks etc.

In the second survey, the climatic condition was in favor of Green sea turtle as there were low tides which couldn't affect the nests at large. In the month

of October, highest number of nests was observed as the nesting period is on peak due to low tides shown in table 1.4. There were number of man-made huts, tourism influence and predators which threat the nests of green sea turtle on the beach. During the survey it was observed that many nests were destroyed by dogs as they predate on eggs of green sea turtles. Therefore dogs were recorded to be the main reason behind decline of a huge number of juveniles of green sea turtle.

Green sea turtle faces many problems in the sea as there are high risks that they are feeding of plastic materials, which are the cause of their deaths. Sea turtle were observed to get choked to death due to consuming on plastic bags and water bottle caps.

Pollution may cause abnormal development, reduced reproduction, nesting deterioration, ill health and habitat disturbance of green sea turtle at Hawke's of light plastic and other marine debris at becoming a dangerous threat for turtle life at offshore. Beside plastic pollution, sound, thermal and chemical pollution also threat to marine life of green sea turtle as well the debris and plastic is destroying the ecosystem functions of it was observed that the accumulation of plastic debris at the beach affect the nesting activity of f sea turtle.

Pollution may cause abnormal development, reduced reproduction, nesting deterioration, ill health and habitat Hawke's bay Karachi. Green sea turtle is highly affected due to large number debris at Hawke's' bay. Increasing costal and offshore marine debris is becoming a dangerous threat for turtle life at offshore. Beside plastic pollution, sound, thermal and chemical pollution also threat to marine life of green sea turtle as well the terrestrial life of turtle at the beach. Marine debris and plastic is destroying the ecosystem functions of Hawke's bay. During the survey at the it was observed that the accumulation of plastic debris at the beach affect the nesting activity of female green sea turtle.

WWF Pakistan and Sindh wildlife department is working on the conservation of green sea turtle. Many handful admirable projects are started by Sindh wildlife department for conservation of nests, eggs, hatchlings and adults of green sea turtle. However, it is very important to increase the knowledge of local

communities and enhance their conservation skills because their role is very important in collaboration with the wildlife department.

4. CONCLUSION

Present study thoroughly recorded the current status of *Chelonia mydas* (green sea turtle) and also carried out a detailed study of their habitat "Hawks Bay" at Karachi. The late night surveys and date time exploration revealed the problematic status of green sea turtles as nesting condition of green sea turtles and rate of pollution at their habitat was high up to threatening level. Green sea turtle that is one of the five turtle species existing in Pakistan encounter the several environmental problems at Hawks bay, Karachi. The results showed that green sea turtle faced wide variety of problems such as high rate of pollution, existence of large number of predators, human encroachment and disturbance at Hawke's bay Karachi. Feeding on plastic materials was observed as one of the main causes of their deaths. Sea turtle were observed to get choked to death due to consuming plastic bags and water bottle caps. Numerous nests of green sea turtles were found deteriorated by the predators like dogs, crows, skunks etc. Due to lack of conservation efforts, the green sea turtles were observed facing the loss of habitat and climate change as well. Green sea turtle was observed being affected by the large number of light plastic and other marine debris at Hawke's bay. Besides that, sound pollution, thermal pollution and chemical pollution also threatened the marine as well the terrestrial life of turtles at the beach. Therefore, there is need of increasing the awareness among local communities about the importance of green sea turtles as they are easily susceptible to anthropogenic activities at every stage of their life. In this context, it is very important to implement strict conservation rules for the conservation of nests and the juveniles of green sea turtles. Implementing the conservation efforts and educating the local people are the serious urge for the conservation of green sea turtles at Hawke's bay.

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CONFLICT OF INTEREST

Author has declared that there is no any conflict of interest regarding publication of this article.

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