

REPORT ON

ASSESSMENT OF SEA TURTLE NESTING ACTIVITY & CONSERVATION OUTCOMES

IN THE COLOMBO DISTRICT OF SRI LANKA - 2026



By The Pearl Protectors

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THE PEARL PROTECTORS

The Pearl Protectors is a volunteer-based and non-profit marine conservation organization in Sri Lanka. Established in 2018, The Pearl Protectors seek to mitigate the impacts of anthropogenic activities on the marine environment, reduce plastic pollution and promote sustainable practices through youth engagement, volunteerism, awareness and advocacy.

The Turtle Patrol is the flagship project of The Pearl Protectors, dedicated to the protection and conservation of sea turtles in Sri Lanka. During the nesting season of the Sea Turtle, i.e., from January to March each year, volunteers patrol the shorelines of the Colombo District to identify and *ex-situ* conserve nests laid by Olive Ridley turtles. The Turtle Patrol initiative also incorporates a citizen science approach, where trained volunteers actively participate in structured data collection alongside conservation authorities and academic partners.

In addition to field conservation, The Pearl Protectors annually hosts Turtle Talk, an awareness campaign aimed at educating the general public on sea turtle conservation and broader marine environmental issues.

Over the years The Pearl Protectors has also undertaken a range of impactful projects, including: launching the 'Pearl Protector Approved' Accredited Standardization Certificate to promote a plastic-free dining culture; the annual construction of a Christmas tree out of discarded plastic bottles to highlight single-use plastic pollution; school education/awareness programs; eco-brick workshops; coastal cleanups including the Nurdle Free Lanka Initiative; Cleaner Seabed for Sri Lanka Underwater cleaning expeditions; commemorating the World Oceans Day by conducting art competition; and social media campaigns to inspire action towards protecting the marine environment.

The purpose of this report is to highlight the impact of the Turtle Patrol during the 2026 sea turtle nesting season, documenting the conservation efforts undertaken by volunteers along the Colombo coastline. The report further analyzes nesting and related data to evaluate the effectiveness of current conservation practices and identify pathways for future improvement.

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DEPARTMENT OF ZOOLOGY AND ENVIRONMENT SCIENCES, UNIVERSITY OF COLOMBO

The University of Colombo is a leading public research university in Sri Lanka, recognized for its long-standing contribution to higher education and scientific research. The Department of Zoology and Environment Sciences, within the Faculty of Science, is actively engaged in teaching, research, and outreach in areas related to biodiversity, ecology, and environmental conservation, with a strong emphasis on addressing contemporary environmental challenges through scientific inquiry.

The Department brings together expertise in marine and coastal ecosystems, wildlife conservation, and applied environmental sciences, contributing to both national and regional research priorities. Its work integrates field-based investigations with analytical and interdisciplinary approaches, supporting evidence-based understanding and management of natural systems.

The Department of Zoology and Environment Sciences, University of Colombo, contributed to the Turtle Patrol 2026 initiative in an academic capacity, with particular emphasis on the development of research design, methodological structuring, and data interpretation frameworks. This contribution facilitated the adoption of a more standardized and systematic approach to data collection, enabling the establishment of a structured baseline dataset to support future conservation and research efforts.

In parallel, a research initiative titled “Dynamics of Sea Turtle Nesting Along the Urban Coastline of Colombo, Sri Lanka” has been developed as a long-term, research-oriented programme aligned with the monitoring activities. This initiative aims to generate scientifically robust outputs that complement and strengthen the evidence base of the ongoing conservation programme.

The research collaboration is led by Dr. Kalpani Marasinghe and Ms. Wathmini De Silva, with Senior Professor Devaka Weerakoon serving as the academic advisor. On the implementation side, the programme is coordinated and co-investigated by Mr. Amila Sumanapala.

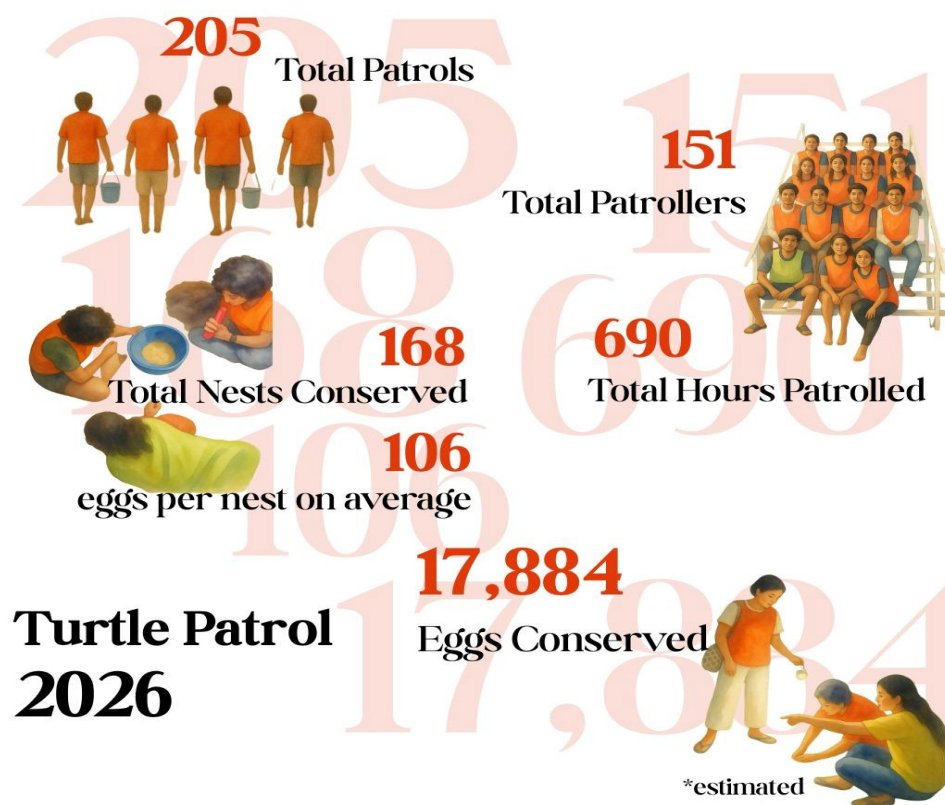
Findings generated through this initiative are expected to contribute to scientific communication through publication in peer-reviewed journals, thereby supporting the dissemination and broader application of evidence-based conservation practices.

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SUMMARY

The Turtle Patrol initiative by The Pearl Protectors aimed to safeguard sea turtles across Dehiwala-Mount Lavinia beach strip. For the year 2026, volunteers patrolled nightly for 81 days, identifying nesting sites, deterring poaching, and relocating eggs with support from the Sri Lanka Coast Guard. Objectives included ensuring that turtles are not disturbed when nesting, conserving turtle eggs and raising awareness about sea turtle conservation. As a result of these efforts, a total of 168 sea turtle nests were identified and conserved. With an average of approximately 106 eggs per nest. The initiative successfully safeguarded an estimated 17,884 sea turtle eggs, contributing significantly to the protection and sustainability of local sea turtle populations while ensuring conservation-based data is gathered to generate baseline database.

In addition to its conservation-focused activities, the 2026 programme incorporated a structured data collection component to support ongoing scientific research. Field observations were systematically recorded to document nesting dynamics, morphometric characteristics, spatial distribution, and associated environmental conditions. This component is aligned with a parallel research initiative developed in collaboration with the Department of Zoology and Environment Sciences, University of Colombo, under permission granted by the Department of Wildlife Conservation. The integration of monitoring and research enables the development of a standardized baseline dataset, contributing to long-term ecological assessments and the advancement of evidence-based conservation strategies.



Summary of the Turtle Patrol 2026

1. INTRODUCTION

Sea turtles are some of the oldest marine reptiles, within the superfamily *Chelonoidea* remaining essentially unchanged since the Cretaceous period. This long career is threatened today due to escalated anthropogenic activities, with sea turtles being killed for meat and their shells, having their eggs eaten, being one of the most affected species by marine plastic pollution, becoming by-catch of the fishing industry, getting entangled in abandoned, lost and discarded fishing gear (ALDFG), and being affected by oil spills. As sea turtles play an important role in maintaining marine food webs, the direct and indirect effects on other marine life forms are significant yet often overlooked. Out of the currently extant seven species of sea turtles, five are found in Sri Lankan waters; Leatherback sea turtles (*Dermochelys coriacea*), Loggerhead sea turtles (*Caretta caretta*), Hawksbill sea turtles (*Eretmochelys imbricata*), Green sea turtles (*Chelonia mydas*), and Olive Ridleys sea turtles (*Lepidochelys olivacea*).

In Sri Lanka, all species of sea turtles have been protected under the Flora and Fauna Protection Ordinance No. 02 of 1937, as amended. Despite this legislation, sea turtles face many of the threats explained above. As a result, some form of conservation intervention is necessary to prevent sea turtle populations from continuously declining, and it is emphasized that multi-stakeholder engagement, along with collective efforts, is necessary for an effective and sustainable solution. Thus, recognizing this gap and as a responsible intervention, Pearl Protectors has initiated, ‘The Pearl Protectors’ Turtle Patrol Project’ in 2022.

Despite of being heavily urbanized, beaches of Colombo, Olive Ridley turtles returning to their natural beaches to nest. These turtles face multiple threats in their nesting journey, including disruptions caused by light and sound pollution, people overcrowding the beach, dogs and other natural predators, and poaching of nests. While the Department of Wildlife Conservation (DWC) is mandated to conserve turtles, including safeguarding their nests and eggs with the assistance of the Sri Lanka Coastguard (SLCG), the Turtle Patrol as a group of responsible volunteers can extend essential assistance to these teams to facilitate their conservation efforts.

For the past four years (2022 to 2025), the Turtle Patrol has aimed at assisting the DWC and SLCG in their conservation efforts, while also collecting data on nesting locations, nest sizes and related parameters through nightly patrols conducted from 10:00 p.m. to 2:00 a.m., between January and March each year. In 2026, an enhanced research component was integrated into the initiative (with the collaboration of the University of Colombo and with approval of the DWC), with a focus on strengthening research design, standardizing data collection protocols, and improving data quality. This development facilitated the generation of a more structured baseline dataset to support long-term ecological assessment and inform future conservation strategies.

Objectives

The objectives of the 2026 Turtle Patrol were to:

- (1) Support in conserving all sea turtle nests through *ex-situ* conservation, in collaboration with DWC and SLCG.

- (2) Minimize sea turtle and turtle egg poaching along the Dehiwala-Mount Lavinia coastal strip.
- (3) Promote citizen science programmes for the conservation and protection of sea turtles nesting along beaches of Colombo.
- (4) Research and create a baseline database development through citizen science initiatives, in collaboration with Department of Zoology and Environment Sciences, University of Colombo.
- (5) Increase awareness amongst beach goers, coastal communities and volunteers on the importance of sea turtle conservation.

2. METHODOLOGY

(i) Duration of the Turtle Patrol:

The Turtle Patrol 2026 was carried out over a period of 81 days, commenced on 6th January and concluded on 31st March 2026. Daily patrols were conducted consistently throughout this period, with the exception of three days due to adverse weather conditions that rendered patrolling impractical.

(ii) Patrolling Procedure:

A total of 197 volunteers took part in the Turtle Patrol 2026, strategically organized into 21 groups to ensure patrols were conducted across all seven days of the week. The patrols were carried out along the beaches of Dehiwala and Mount Lavinia, which were divided into three operational sections as Dehiwala North, Dehiwala South, and Mount Lavinia.

Each section was assigned a dedicated team responsible for its coverage. To uphold efficiency, effectiveness, and safety, every area was staffed with a minimum of four patrollers, under the supervision of well trained and experienced group leaders.

Prior to the commencement of the patrolling season, all volunteers underwent a comprehensive training program consisting of three compulsory sessions: (1) an online training module delivered through the Turtle Patrol App; (2) virtual sessions covering patrolling fundamentals; and (3) practical in-field training sessions.

Patrols were initiated at 10:00 p.m. and typically continued until around 2:00 a.m., although some extended beyond this timeframe. Patrollers walked along the coastline, monitoring for nesting activity, hatchlings, turtle tracks, and the presence of turtles.

Whenever nests, hatchlings, or turtles were encountered, patrollers recorded the precise locations in the Turtle Patrol App developed by the Pearl Protectors. In addition, ambient light and sound readings were collected during patrols and entered into the application to support data accuracy and consistency.

(iii) Data Management and Communication:

All volunteers were registered onto the Turtle Patrol App to track and monitor their patrols, and collected data were stored saved on to the Turtle Patrol App. To further enhance

coordination and communication, volunteers were also integrated into a dedicated WhatsApp group, ensuring timely updates and effective information sharing throughout the patrol season.

(iv) Ex-situ Conservation Process:

The Turtle Patrol adopts an *ex-situ* conservation model, whereby nests discovered along the beaches of Dehiwala-Mount Lavinia are relocated to the nearest Sri Lanka Coast Guard point by both Research Assistant volunteers or by Sri Lanka Coast Guard personnel. This ensures that eggs and hatchlings are safeguarded within designated conservation areas, protected from predators, poachers, and other threats.

Nests were located either by directly observing a nesting turtle or by spotting fresh turtle tracks/nesting crawls on the sand. When a turtle is observed, volunteers request beachgoers and restaurant patrons to maintain a minimum distance of 20 feet from the turtle. Patrollers also keep the same distance to avoid disturbance. As the turtle nears completion of egg-laying, the trained research assistant carefully recorded the curved carapace length (CCL) and curved carapace width (CCW) using standard protocols approved by the DWC. Once the turtle returns to the sea, the eggs were carefully collected, and the depth of the original nest was measured. The eggs were then relocated to the designated Sri Lanka Coast Guard point. Handling of the sea turtle eggs were conducted by the Research Assistant volunteers.

At the Coast Guard point, a nest replicating the original dimensions is created. The eggs are placed within this protected, net-fenced conservation area, where they remain until hatching. Each nest within this conservation area is marked with a board indicating the date of nesting, the number of eggs in the nest, the expected date of hatch, and the turtle species.

(v) Conservation of Hatchlings:

During patrols, when hatchlings are discovered, patrollers follow standard procedures to ensure their safety. The surrounding area is carefully scanned, and all hatchlings are collected under the supervision of Sri Lanka Coast Guard personnel. Patrollers also attempt to locate the nest and assess its condition. Once all hatchlings are gathered and confirmed to be active and mobile, they are immediately released into the ocean in accordance with established protocols.

For eggs conserved at the Sri Lanka Coast Guard points, hatchlings were released by the Sri Lanka Coast Guard. After hatching, hatchlings are collected and released after dusk, a practice that maximizes survival rates by reducing exposure to predators and environmental hazards.

(vi) Collection of Carapace Morphometric Data:

During the Turtle Patrol 2026, carapace morphometric data were systematically collected. Measurements included CCL and CCW recorded in centimeters using a flexible measuring tape in accordance with standard sea turtle monitoring protocols. The CCL was measured along the midline of the carapace, while the CCW was taken at its widest point.

Data entries were excluded from analysis in cases where turtles were not encountered, measurements could not be completed, or individuals returned to the sea prematurely. The resulting dataset was used to assess size distribution and morphometric variation among nesting

females, providing valuable insights into population structure and potential deviations from typical size ranges reported for the species.

Special permission was obtained from the Department of Wildlife Conservation to handle nesting sea turtles and collect carapace morphometric data.

(vii) Data Collection and Documentation:

At the conclusion of each patrol, detailed records of the day's activities were compiled and recorded by each group using a standardized 'Log Form'. The patrol logs included comprehensive details such as the date and day of patrol, location, team attendance, number of patrol rounds and observations such as turtle sightings, nesting activity or hatchlings. In addition, key data points were including whether a turtle was found, egg laying time, turtle species, egg count, number of deformed eggs, general observations, egg and hatchling locations, depth of the nest, CCL and CCL, hatchling count and descriptions, hatchling emergence time, observations on hatchlings, patrol end time as well as other remarks or thoughts recorded by the patrolling teams. At the conclusion of each patrol, every group completed a standardized Log Form to record detailed accounts of the day's activities.

(viii) Limitations:

The data collection methods employed during the Turtle Patrol 2026 faced several limitations including the following:

- (a) **Hatchling data:** While data on hatchlings encountered during patrols was collected, The Pearl Protectors did not have access to information regarding hatchlings from nests at the Coast Guard Point. Consequently, although records of turtle nesting were maintained, the success rate of each nest could not be determined.
- (b) **Weather constraints:** Adverse weather conditions prevented patrolling on three days, resulting in gaps in data collection.
- (c) **Restricted patrol hours:** Whilst patrols were conducted between 10:00 p.m. and 2:00 a.m., turtles have been recorded nesting from 8:00 p.m. to 5:00 a.m. Consequently, nesting events outside patrol hours were not captured.
- (d) **Coverage limitations:** As patrollers moved from one end of the beach to the other, turtles nesting at a distance could be missed. In some cases, it was noted that poachers erased tracks before patrollers arrived, further reducing data accuracy.
- (e) **Ambient sound and light readings:** Although a minimum of two readings (at the start and end of patrols) was intended, these were not consistently collected. Volunteers often prioritized nest conservation, and when multiple turtles nested simultaneously, completing the scheduled three patrol rounds per section became impractical.
- (f) **Environmental challenges:** In certain instances, only partial readings were taken due to erosion or high tide, which rendered sections of the beach untraversable.

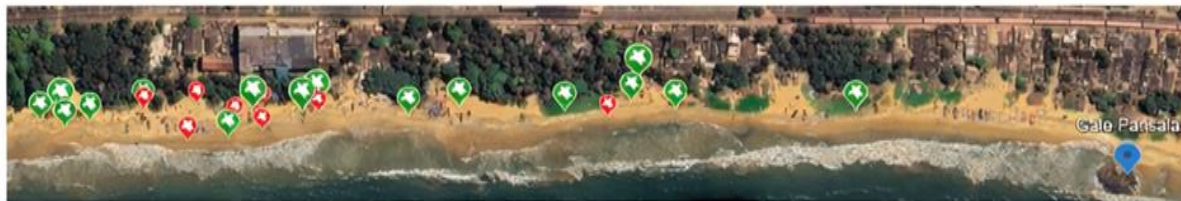
3. RESULTS

(i) Conservation outcomes during the 2026 patrol season:

Only Olive Ridley turtles were recorded nesting along the Dehiwala-Mount Lavinia coastline during the 2026 season. A total of 168 nests were identified and conserved through the *ex-situ* conservation programme, including 89 nests in Dehiwala and 79 nests in Mount Lavinia. Based on an average clutch size of approximately 106 eggs per nest, an estimated 17,884 eggs were safeguarded during the season, comprising 9,447 eggs from Dehiwala and 8,437 eggs from Mount Lavinia. Clutch size varied considerably among nests. The smallest recorded clutch contained 8 eggs, while the largest contained 162 eggs. In addition to nest conservation, 1,289 hatchlings encountered *in-situ* along the beach were recorded and released safely into the sea under the observation of SLCG.



a. Barracuda Restaurant to Pink Salt



b. Pink Salt to Gale Pansala



c. Gale Pansala to Sugar Beach



d. Sugar Beach to Mount Lavinia Hotel

● Nesting site / Eggs Found ♥ Hatchlings Found

Figure 1. Google Maps visualization illustrating the nesting frequency and in-situ hatchling occurrences of Olive Ridley turtles recorded during turtle patrols in 2026 along the Dehiwala–Mount Lavinia coastline.

(ii) Annual conservation summary:

The 2026 season formed part of a broader conservation effort that has expanded over the last four years.

Across the season, 205 patrols were completed, amounting to 690 hours of active beach monitoring. On average, each volunteer contributed 4 hours and 34 minutes of patrolling time, while a typical patrol lasted 3 hours and 22 minutes.

A comparison of annual results from 2023 to 2026 shows a marked variation in the number of volunteers, nests conserved, and eggs protected relative to the early years of the programme, although 2026 recorded lower totals than the peak observed in 2025.

Table 1: Summary of Turtle Patrol conservation results from 2023 to 2026 in the Colombo District.

Year	Volunteers	Days	Nests <i>ex-situ</i> conserved	Eggs conserved
2023	60	60	72	7,944
2024	130	90	130	14,204
2025	200	84	202	21,389
2026	151	85	168	17,884

(iii) Spatial distribution of nesting activity:

Figure 2 below shows the spatial representation of Olive Ridley turtle nesting density along the Dehiwala–Mount Lavinia coastal stretch in 2026. The figure comprises two maps. The first map (left) delineates the study area into 16 equidistant segments, each approximately 100 m in length. The second map (right) illustrates the nesting density within each segment using a color gradient: light yellow indicates 1–5 nests, yellow indicates 6–10 nests, orange indicates 11–15 nests, red indicates 16–20 nests, and dark red indicates 21–25 nests recorded during turtle patrols.

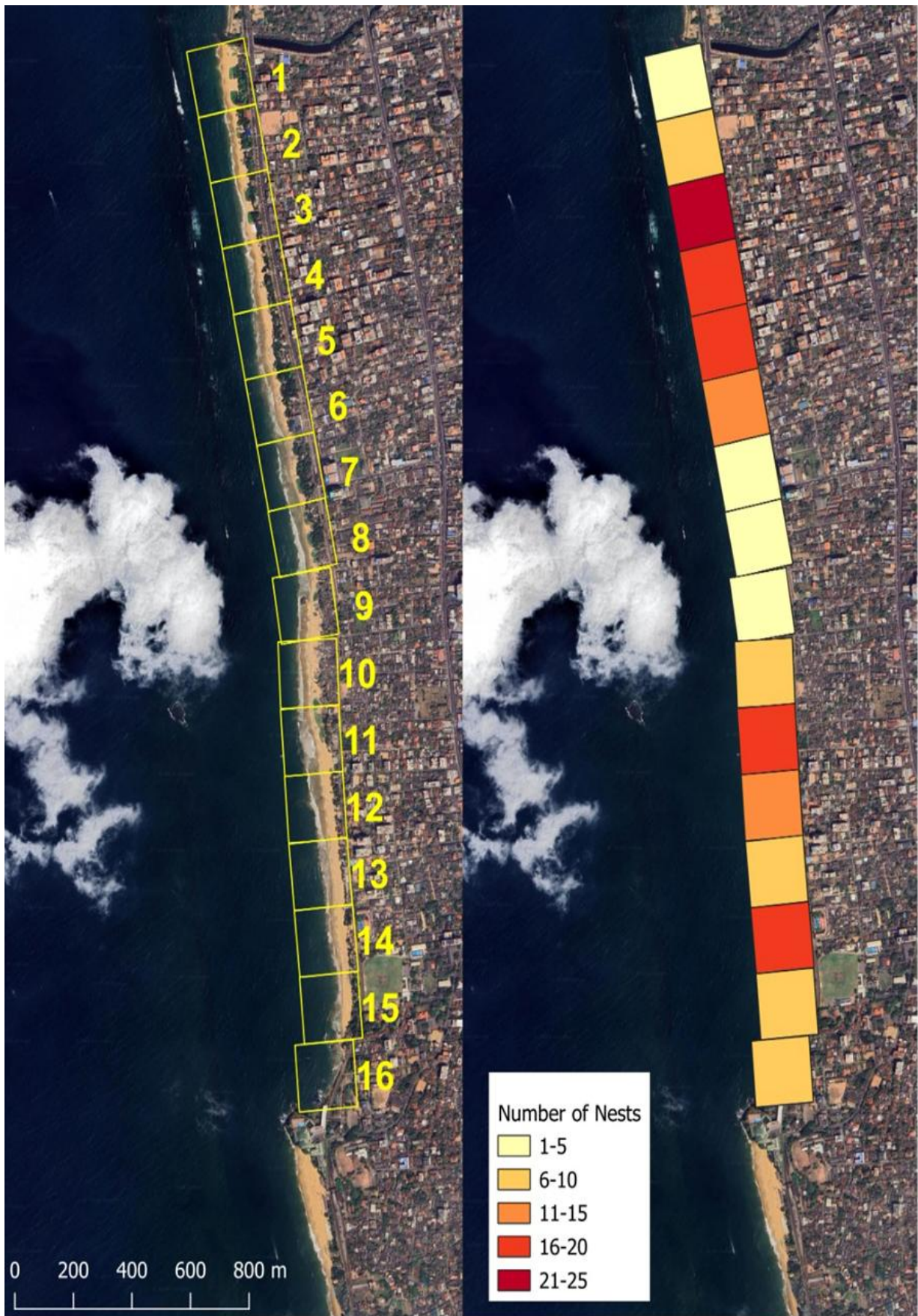


Figure 2. Spatial representation of Olive Ridley turtle nesting density along the Dehiwala–Mount Lavinia coastal stretch in 2026.

(iv) Nest depth:

Nest depth measurements were recorded for 143 Olive Ridley turtle nesting events. Recorded depths ranged from 17.5 cm to 66.0 cm, with a mean nest depth of approximately 46.8 cm. Most nests fell within the range of 42 – 52 cm, indicating a relatively consistent nest depth among recorded nesting females.

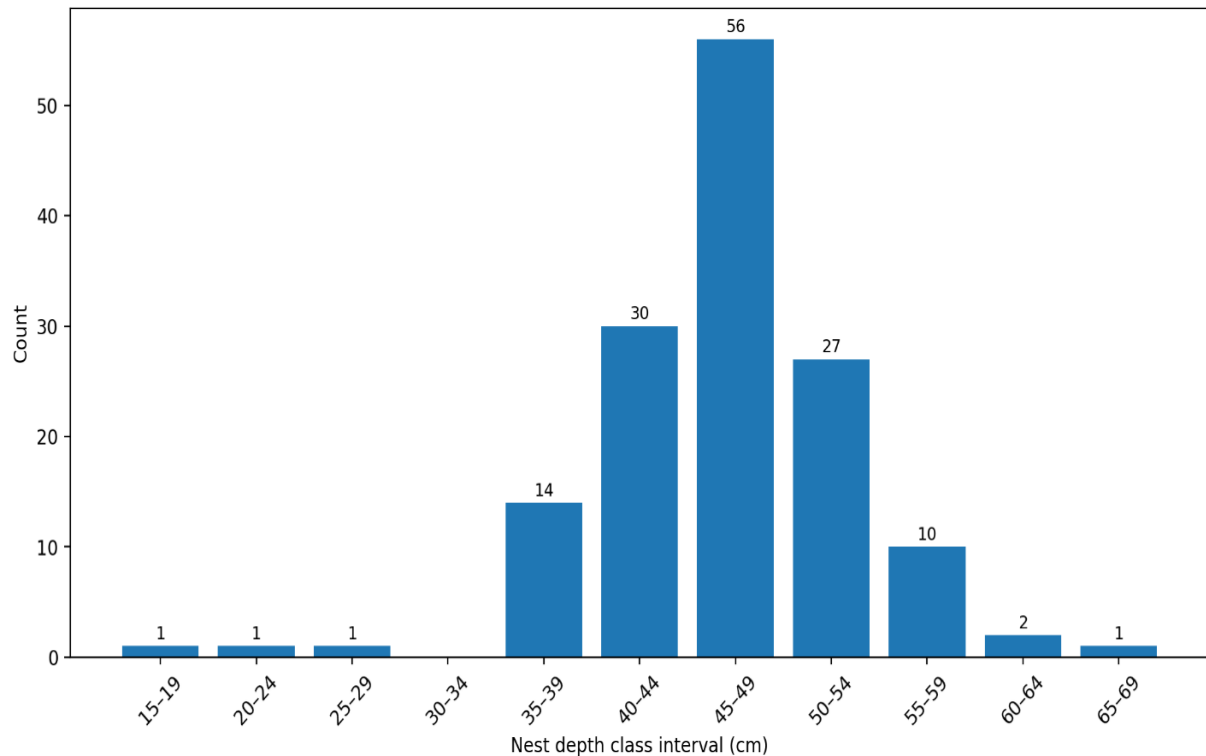


Figure 3. Nest depth distribution of Olive Ridley turtles recorded during the 2026 nesting season in the Colombo District.

(v) Carapace morphometrics of nesting females:

Morphometric measurements were collected from 58 nesting female Olive Ridley turtles from 16th February 2026 to 31st March 2026.

CCL ranged from 48 cm to 77 cm, with a mean of approximately 68.9 cm. Most measured turtles were clustered within the 65–74 cm range.

CCW ranged from 47 cm to 73 cm, with a mean of approximately 66.6 cm. As with CCL, most individuals fell within a relatively narrow adult size range (65-74 cm), suggesting consistency in the size of nesting females recorded during the season.

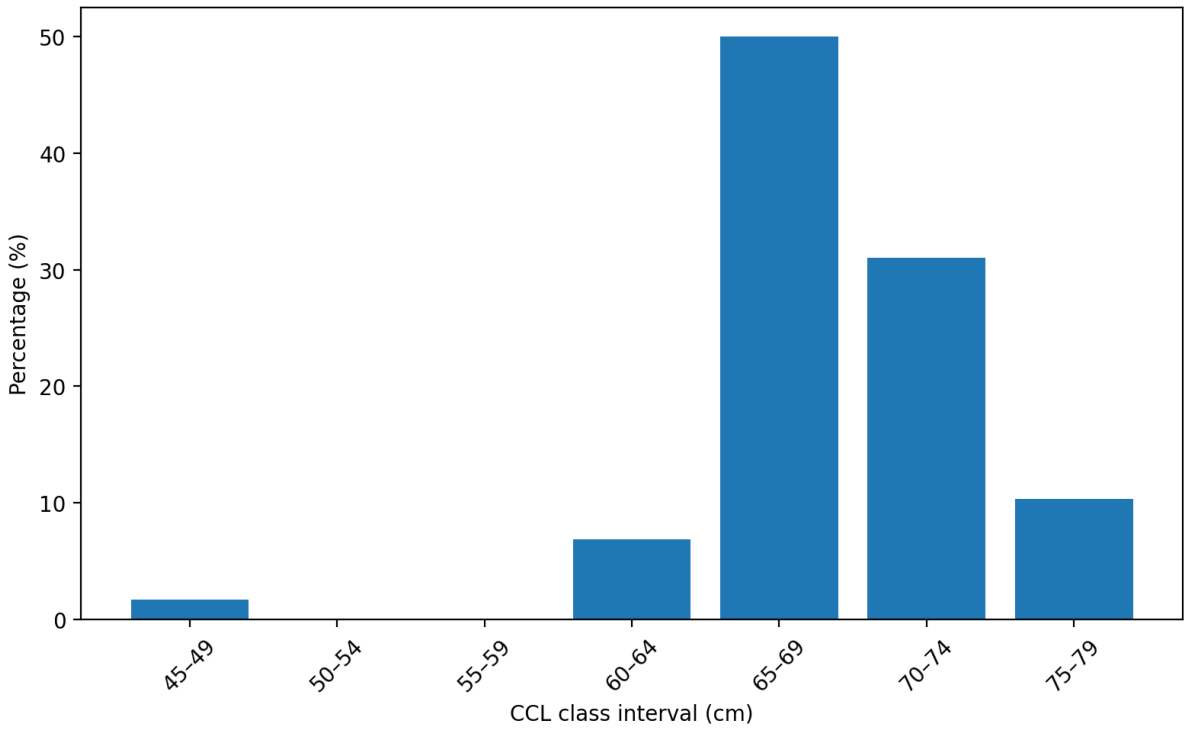


Figure 4. Percentage distribution of curved carapace length (CCL) of Olive Ridley turtles recorded during the 2026 nesting season in the Colombo District.

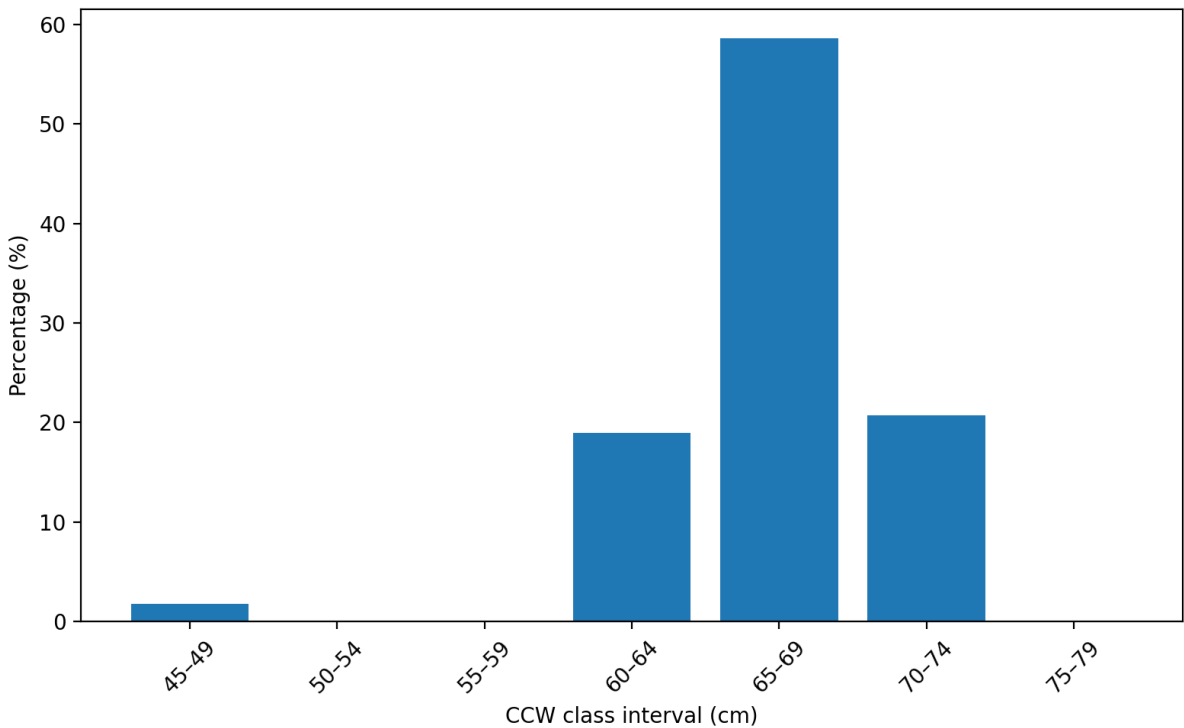


Figure 5. Percentage distribution of curved carapace width (CCW) of Olive Ridley turtles recorded during the 2026 nesting season in the Colombo District.

(vi) Temporal pattern of nesting activity in relation to lunar phase:

Temporal analysis of nesting records suggested that nesting activity varied across the lunar cycle. Nesting peaks were observed around the full moon and the adjacent first and third quarter phases whereas lower or more moderate nesting activity was recorded during intervening periods. Nevertheless, an exception was noted in January, when a nesting peak occurred during the new moon.

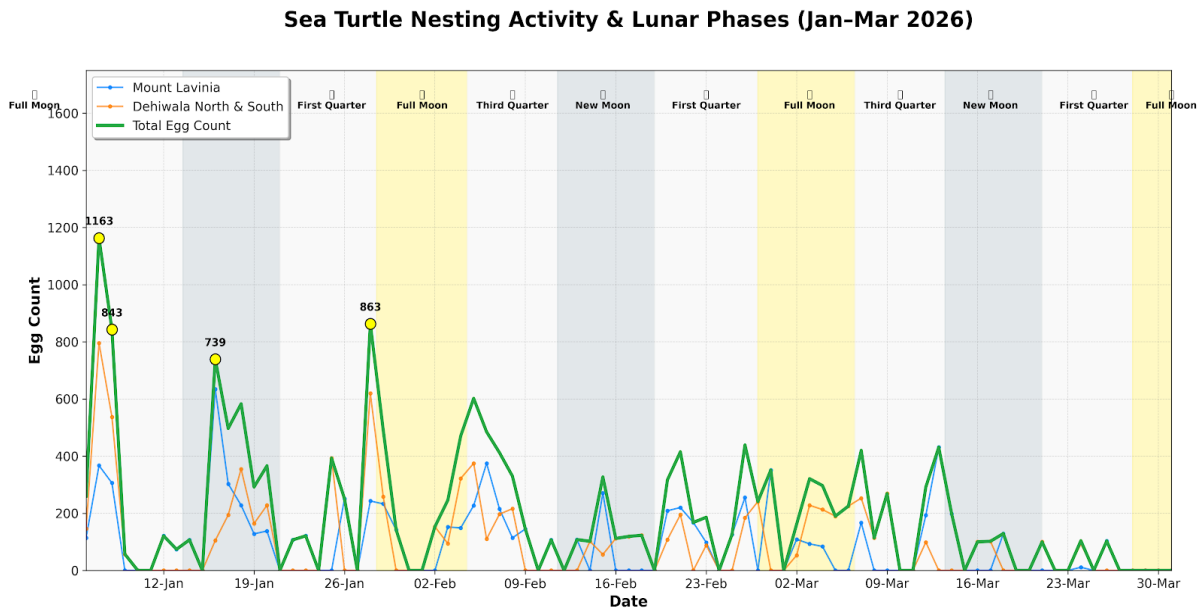


Figure 6. Temporal variation in Olive Ridley turtle nesting activity in relation to lunar phases along the Dehiwala–Mount Lavinia coastline in 2026.

(vii) Temperature patterns during the nesting season:

Average monthly temperature data for Colombo from January to March of 2024, 2025, and 2026 showed a gradual upward trend. Across the three-year period, monthly minimum, maximum, and average temperatures all increased slightly.

Table 2. Monthly average temperature patterns in the Colombo District for January–March, 2024–2026.

Month-Year	Lowest Avg Min (°C)	Highest Avg Max (°C)	Avg Temp (°C)
Jan-24	25.5	30.2	27.6
Feb-24	25.7	30.6	28.0
Mar-24	26.0	31.0	28.5
Jan-25	25.6	30.3	27.7

Feb-25	25.8	30.7	28.1
Mar-25	26.1	31.1	28.6
Jan-26	25.7	30.4	27.8
Feb-26	25.9	30.8	28.2
Mar-26	26.2	31.2	28.8

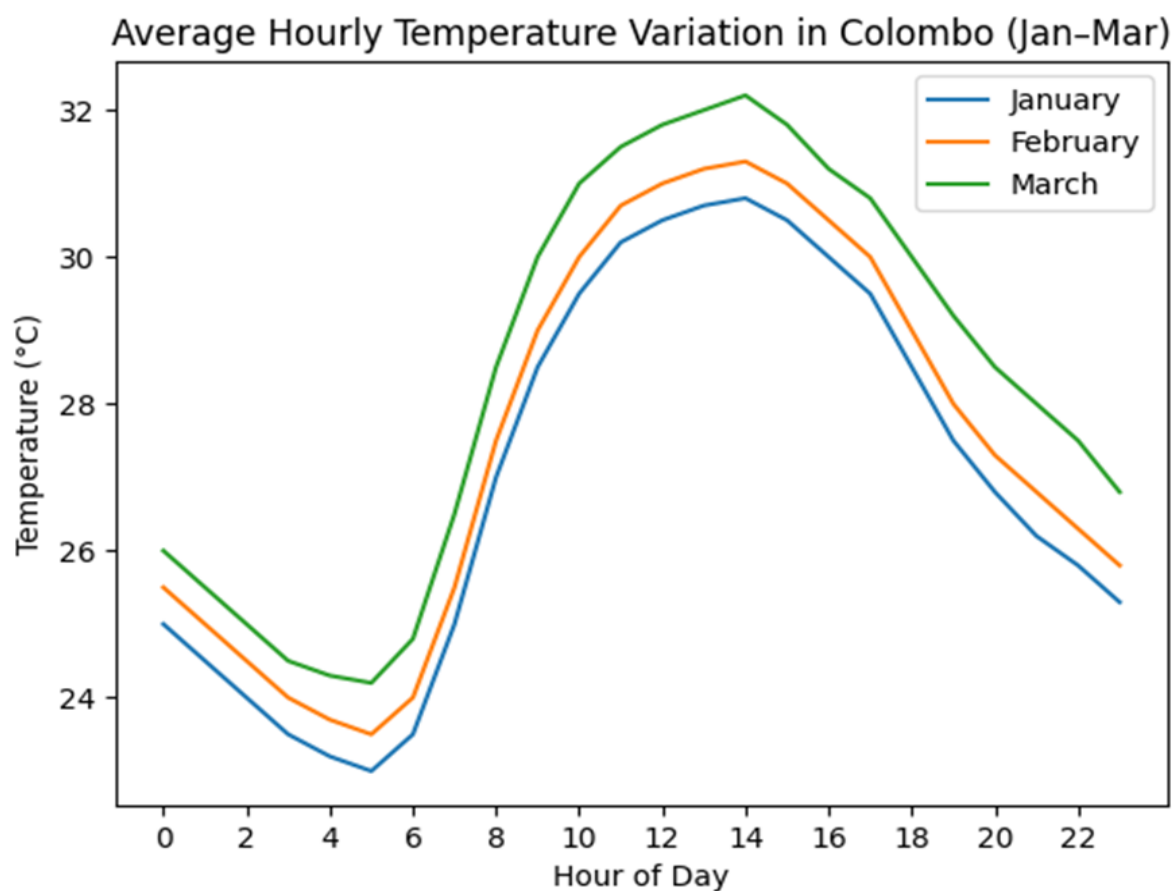


Figure 7. Average hourly temperature variation in Colombo from January to March 2026.

4. FIELD OBSERVATIONS RECORDED DURING PATROLS

(i) Coastal erosion and vegetation removal:

Severe coastal erosion was observed along Dehiwala-Mount Lavinia beaches compared with previous years. In multiple instances, Olive Ridley turtles were unable to climb steep, eroded embankments to access suitable nesting sites. This was particularly evident in shoreline segments 1 – 2 and 8 – 10, where low nesting density corresponded with visibly high levels of shoreline erosion.

In Mount Lavinia, erosion also exposed previously buried waste, which was subsequently washed back into the sea, further degrading the coastal environment. Patrollers repeatedly noted that areas where coastal vegetation remained intact appeared more stable, whereas sections where vegetation had been removed showed more pronounced erosion. It was also observed that in some locations, areas with reduced or removed coastal vegetation were observed, particularly in sections associated with developed beachfront zones, likely contributing to shoreline instability.



Figure I: Severe erosion close to the Barracuda restaurant



Figure II: Severe erosion close to Gale Pansala



Figure III: Severe erosion close to the Barracuda restaurant



Figure IV: Removal of coastal vegetation

(ii) Expansion of coastal infrastructure and beach-user disturbance:

An important recurring observation during the 2026 patrol season was the increase in coastal infrastructure, particularly restaurants, along the Dehiwala–Mount Lavinia shoreline. This expansion was observed alongside increased human activity and reduced undisturbed beach areas (such as stronger light and sound pollution) which reduced nesting space for Olive Ridley turtles, especially along the narrower Dehiwala beach.

The Google Maps image sequence used in this report shows a progressive increase in coastal construction over the five-year period from 2020 to 2025. In the earlier images, only a few isolated structures were visible along the beachfront, with larger stretches of natural sand and

coastal vegetation still intact. By 2024–2025, the coastline appeared more densely lined with restaurants and commercial establishments, replacing formerly open or vegetated areas and leaving less undisturbed beach habitat for nesting turtles.

Several direct disturbance incidents involving beach users were documented during patrols. Nesting turtles close to restaurant seating areas often attracted large numbers of onlookers. Patrollers recorded cases of flash photography, people touching turtles, and turtles returning to the sea without laying eggs following disturbance.

Emerging hatchlings near restaurants were also disturbed; in one case a hatchling was accidentally stepped on, and in other instances beach users picked up hatchlings as they crawled toward the sea.

At the same time, patrollers also observed that there were many situations where restaurant staff acted responsibly by discouraging visitors from disturbing turtles and advising them to maintain an appropriate distance, thereby demonstrating a level of awareness regarding the importance of conservation. Nevertheless, the placement of tables, chairs, temporary structures, and semi-permanent infrastructure up to the foreshore was repeatedly noted as reducing the available nesting habitat.

Fireworks displays and the use of confetti were also observed along the beach, with debris remaining in the sand for several weeks after events. In addition, bright lights and loud music from beachfront establishments created a continuous source of sound and light pollution during night-time patrol hours.

Barracuda restaurant to Pink Salt



Figure 8. Progressive increase in coastal construction and corresponding loss of coastal vegetation along the Dehiwala–Mount Lavinia shoreline from Barracuda Restaurant to Pink Salt between 2020 and 2025.

Pink Salt to Gale Pansala

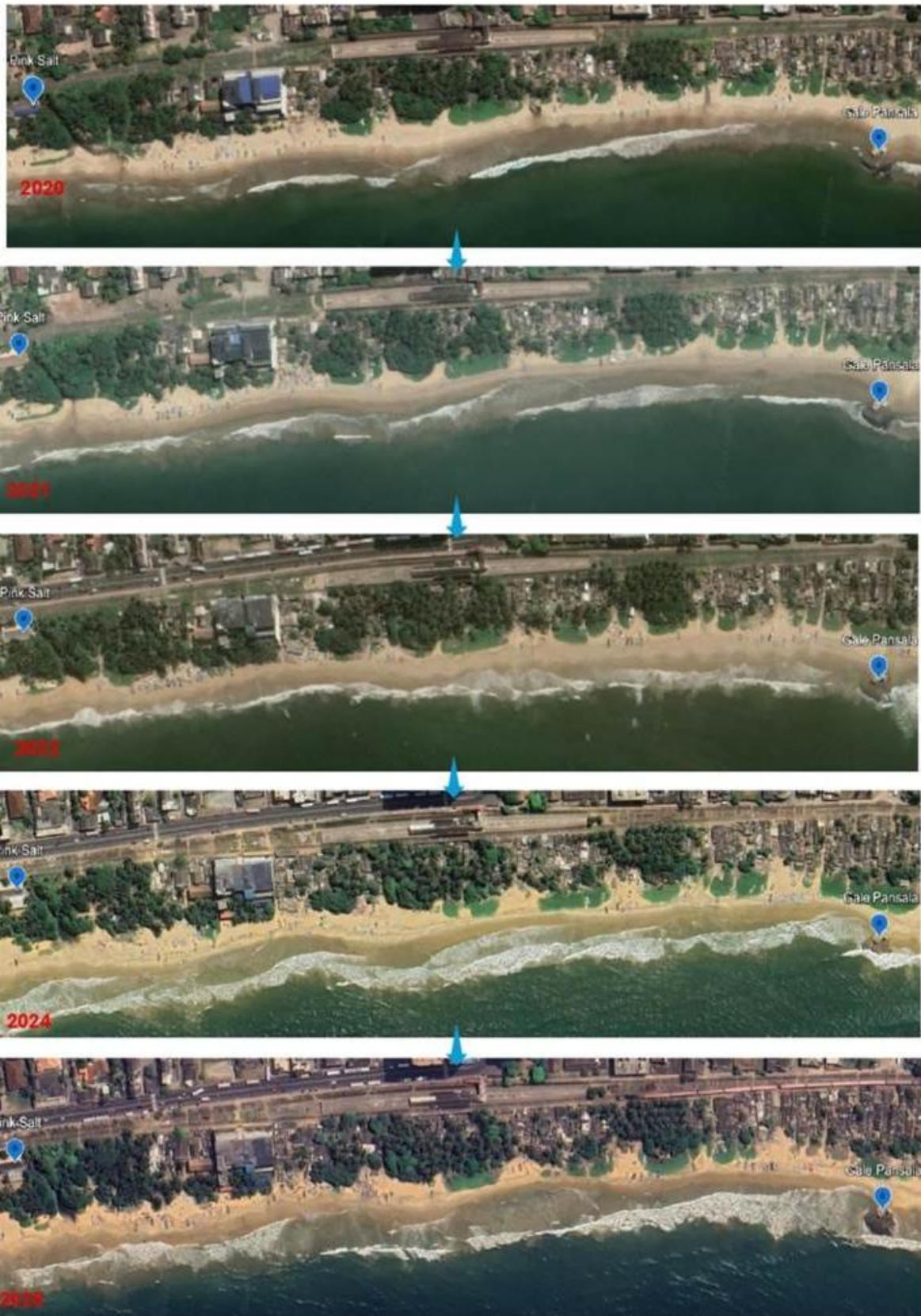


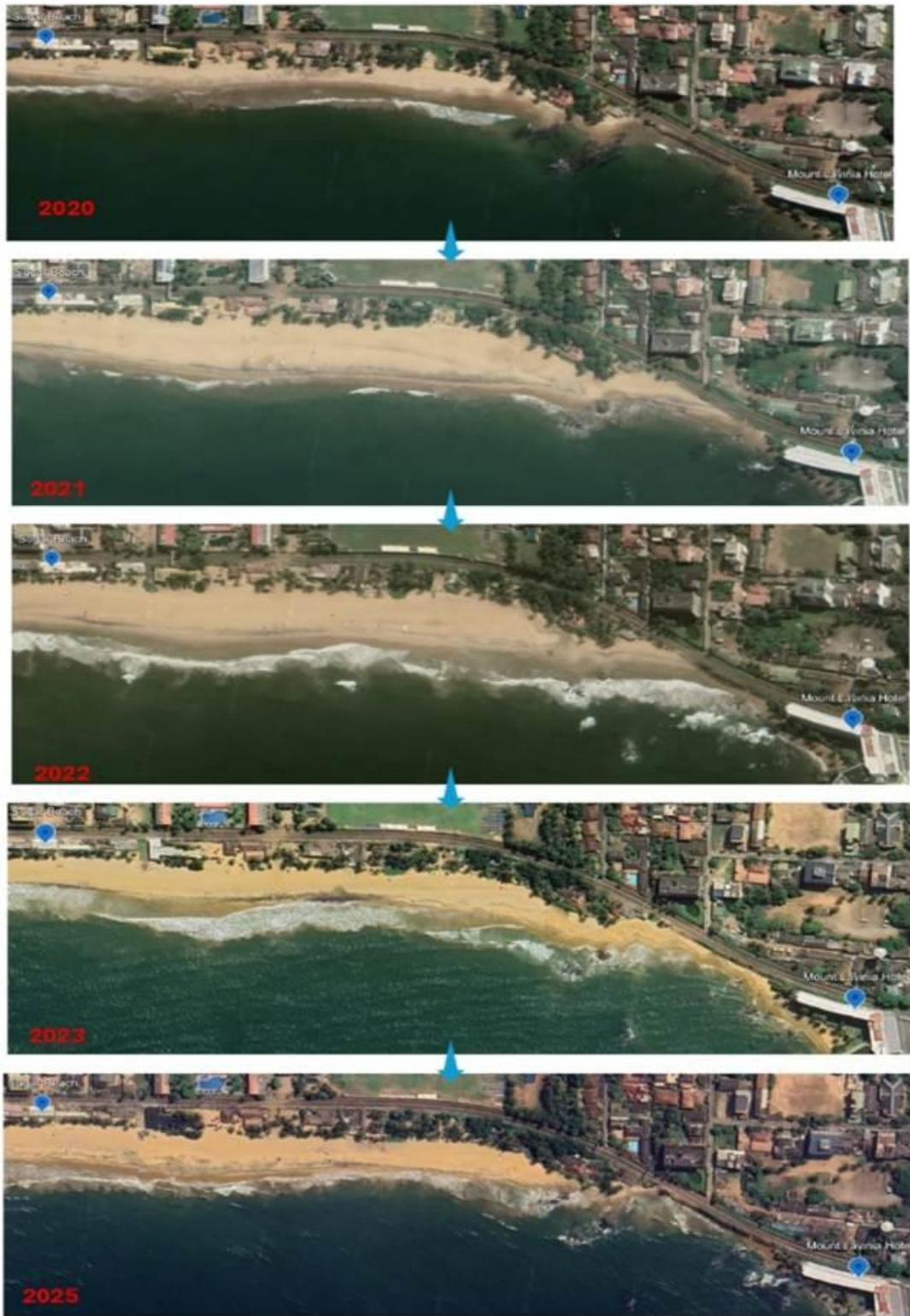
Figure 9. Progressive increase in coastal construction and corresponding loss of coastal vegetation along the Dehiwala–Mount Lavinia shoreline from Pink Salt to Gale Pansala between 2020 and 2025.

Gale Pansala to Sugar Beach



Figure 10. Progressive increase in coastal construction and corresponding loss of coastal vegetation along the Dehiwala–Mount Lavinia shoreline from Gale Pansala to Sugar Beach Restaurant between 2020 and 2025.

Sugar Beach to Mount Lavinia Hotel



This figure shows the changes along the coastline over the years.

Figure 11. Progressive increase in coastal construction and corresponding loss of coastal vegetation along the Dehiwala–Mount Lavinia shoreline from Sugar Beach Restaurant to Mount Lavinia Hotel between 2020 and 2025.



Figure V: Nesting turtles and emerging hatchlings often attract significant attention from bystanders. This can cause disturbance and stress, and patrollers have observed cases where turtles returned to the sea without laying eggs due to disruption.



Figure VI: Fireworks displays and the use of confetti have been observed along the beach, with debris remaining in the sand for several weeks



Figure VII: Beach restaurants provide a continuous form of sound and light pollution with their bright lights and hard music.

(iii) Garbage disposal, open pits, and wastewater discharge

Localized waste disposal practices, including on-site burial and burning of waste, were observed along sections of the beach. In several cases, Olive Ridley turtle nesting sites were located close to areas where garbage had been buried. Large open pits, approximately two to three feet deep, were also observed in some sections of the beach where waste had been buried.

These pits were considered a potential risk to turtles, as nesting females or hatchlings could fall into them.

Localized wastewater discharge into the foreshore was observed in some sections of the coastline specifically in Dehiwala, after which it flowed directly into the sea. These observations point to additional environmental pressures operating alongside direct nesting disturbance.



Figure VIII: Garbage dump close to Gale Pansala

(iv) Nest condition, spoiled eggs, and possible heat-related impacts

Several nests at the hatchery near the Coast Guard point were observed to be spoiled, with no viable hatchlings emerging. In addition to the hatchery losses, patrollers documented two *in-situ* nests containing spoiled eggs, partially developed embryos, and dead hatchlings.

The 2026 nesting season coincided with very warm conditions in Colombo. Although sand temperature was not directly measured at nests, the observed condition of these failed nests was recorded as an important field observation because elevated ambient and sand temperatures can compromise embryonic development and reduce hatching success.



Figure IX: Nest containing spoiled eggs, partially developed embryos, and dead hatchlings



Figure X: Nest containing spoiled eggs, partially developed embryos, and dead hatchlings

(v) Hatchling entanglement in fishing nets and hatchling mortality

Hatchling mortality associated with fishing gear was also recorded along the Dehiwala–Mount Lavinia coastline. Several dead hatchlings were found entangled in discarded or active nearshore fishing nets, indicating that even hatchlings that successfully emerged from nests encountered immediate post-emergence threats in the nearshore environment.



Figure XI: Hatchlings found entangled in fishing nets

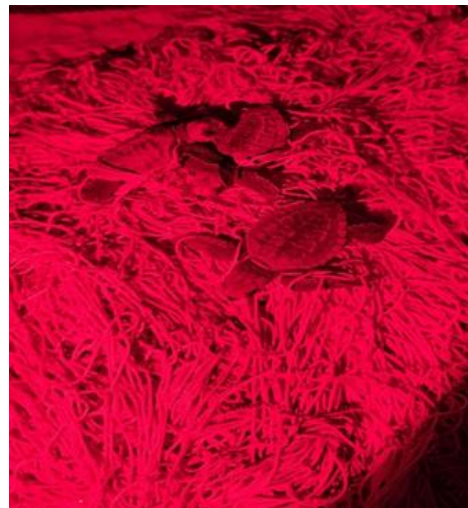


Figure XII: Hatchlings found entangled in fishing nets

(vi) Other biological observations

Patrollers also recorded occasional connective tissues or membranes expelled by nesting females. These tissues are associated with the reproductive process and help form or transport eggs while still inside the female. Although such material is less commonly seen with eggs inside a nest, it can occur, particularly if the female was stressed or if physiological changes occurred during egg laying. This observation was retained in the report because it may be relevant for interpreting unusual nesting events in future seasons.



Figure XII: Connective tissues or membranes expelled by nesting females

5. DISCUSSION

(i) Overall conservation outcomes

The Turtle Patrol 2026 highlights the continued importance of structured, volunteer-based conservation along the urban beaches of Dehiwala-Mount Lavinia. Although the number of nests recorded in 2026 was lower than the peak observed in 2025, the programme still documented and conserved a substantial number of Olive Ridley turtle nests and eggs, demonstrating the continuing value of patrol-based intervention in an environment where nests are exposed to poaching, predation, trampling, human disturbance, and habitat degradation. The Colombo coastline therefore continues to function as a nesting area for Olive Ridley turtles, while also showing clear signs of increasing ecological pressure.

The year-to-year pattern in nesting activity suggests interannual variability alongside overall conservation gains. Between 2023 and 2025, both the number of nests and the number of eggs conserved increased substantially, peaking in 2025 with 202 nests and 21,389 eggs protected. Although 2026 recorded a decline to 168 nests and 17,884 eggs, nesting activity remained higher than in 2023 and 2024, indicating that the Turtle Patrol initiative has continued to be effective despite natural fluctuations. These variations are likely influenced by a combination of biological reproductive cycles, shifting oceanographic conditions, and ongoing anthropogenic pressures in urban coastal environments, highlighting the need for adaptive, long-term conservation strategies.

At the same time, an important limitation remains. Although nesting activity was well documented, the absence of hatchling emergence data from nests managed at the Coast Guard Point hatchery meant that the true hatching success of each conserved nest could not be assessed. Systematic collection of hatchling-release and hatch success data in future years will therefore be essential for accurately evaluating nest outcomes and strengthening evidence-based conservation planning. In this regard, enhanced collaboration with the Sri Lanka Coast

Guard at designated conservation sites is recommended to facilitate improved data access and coordination in the coming years.

(ii) Spatial variation in nesting activity

The distribution of nesting activity along the Dehiwala–Mount Lavinia coastline was uneven, indicating that some sections of the beach are used more frequently for nesting than others. This non-uniform pattern likely reflects differences in local beach conditions, accessibility, and the degree of disturbance experienced in different sectors. Areas with lower nesting density appear to coincide with stretches of coastline affected by severe erosion, suggesting that physical alteration of the beach is already limiting the availability of suitable nesting habitat.

This pattern is important because successful nesting depends not only on the presence of turtles offshore, but also on the ability of females to access and use appropriate beach habitat. Where erosion has created steep embankments or narrowed the beach, turtles may be prevented from reaching suitable nesting sites. In such cases, reduced nesting activity may reflect deterioration in habitat conditions rather than an absence of turtles from the area. The spatial pattern of nesting observed during the season therefore provides useful insight into how habitat quality is influencing nesting behaviour along this urban coastline.

(iii) Nest depth and nesting behaviour

The nest depth data collected during the 2026 season showed that most nests fell within a relatively narrow range, suggesting broadly consistent nesting behaviour among females under prevailing beach conditions. This consistency indicates that, despite local variability in beach structure, many females were still able to construct nests within a typical depth range suitable for incubation.

At the same time, the occurrence of shallower and deeper nests may reflect local differences in sand composition, compaction, moisture, erosion, or individual variation among nesting females. Such variation is ecologically important because nest depth affects the incubation environment, including temperature and moisture conditions experienced by developing embryos. As a result, departures from the common nesting depth range may influence hatching success and embryo development. Although the available data do not allow a more detailed comparison of nest depth with exact location, turtle morphometrics, or disturbance level, the measurements collected in 2026 provide an important baseline for future monitoring and more refined analysis.

(iv) Carapace morphometrics and population characteristics

The morphometric data collected from nesting females indicate that most individuals fell within a relatively narrow adult size range, suggesting that the observed nesting population is broadly consistent in body size and represents a stable adult breeding class. The presence of a few larger individuals may reflect occasional larger or more mature females within the nesting population, but overall the measurements indicate limited variation in the body size of turtles encountered during patrols.

The collection of curved carapace length and curved carapace width data adds an important biological dimension to the patrol dataset beyond simple nest counts. Repeated morphometric monitoring over time may help identify whether the nesting population remains stable, whether size distributions shift, or whether body size becomes associated with clutch size, nesting success, or habitat use. A small number of outliers and anomalous measurements were excluded from analysis, reflecting the realities of field-based data collection at night and reinforcing the importance of continued standardization and training in measurement protocols.

(v) Influence of lunar cycles on nesting activity

A noticeable temporal pattern was observed in relation to lunar cycles, with increased nesting activity occurring around the full moon and the adjacent lunar quarters. This pattern suggests that Olive Ridley nesting behaviour along this coastline may be influenced by cyclical environmental cues associated with lunar phase. These cues may include lunar-driven tidal dynamics and variations in nighttime illumination, both of which can influence beach accessibility, navigation, and predator avoidance behaviour.

From a conservation perspective, this pattern is valuable because understanding temporal peaks in nesting activity may help improve future patrol planning and volunteer deployment. In a volunteer-based programme, identifying periods of increased nesting likelihood can improve the efficiency of monitoring and conservation effort. The repeated clustering of nesting peaks around particular lunar phases highlights the ecological sensitivity of Olive Ridley turtles to cyclical environmental cues and supports the integration of lunar periodicity into future monitoring and conservation planning.

(vi) Impact of coastal erosion on nesting habitat

One of the most significant observations made during the 2026 season was the severity of coastal erosion along Dehiwala-Mount Lavinia beaches. Compared to previous years, erosion appeared more pronounced, and in several instances turtles were unable or struggled to climb steep, eroded sections of the beach in order to reach suitable nesting areas. This indicates that erosion is not merely a general coastal concern, but a direct constraint on sea turtle nesting along this shoreline.

In Mount Lavinia, erosion exposed previously buried garbage, which was subsequently washed back into the sea, adding to the degradation of the coastal environment. The relationship between erosion and habitat suitability is therefore multifaceted: erosion reduces beach width, creates steep barriers to nesting females, destabilizes the substrate, and can re-expose buried debris that further degrades habitat quality. Areas with low nesting density were also associated with severe erosion, reinforcing the conclusion that shoreline instability is affecting the suitability of the beach for turtle nesting.

To mitigate these impacts and support both shoreline stability and turtle conservation, priority should be given to restoring and protecting coastal vegetation, including dune grasses and shrubs that naturally stabilize sand and reduce erosion. In addition, waste management systems

need to be strengthened, particularly in areas where erosion has already exposed buried debris. Regular beach clean-ups and strengthening existing waste management and regulatory frameworks may help reduce the ongoing degradation of turtle nesting habitat.

(vii) Role of coastal vegetation in shoreline stability

Observations made during the season suggest that the removal of coastal vegetation has contributed substantially to shoreline instability. Areas where vegetation remained intact appeared more resilient to erosion, whereas areas where vegetation had been removed showed greater shoreline degradation. It was also observed that some coastal infrastructures had purposely removed much of the coastal vegetation.

This has clear conservation implications. Coastal vegetation acts as a natural stabilizing system by holding sand in place, buffering wave and wind action, and maintaining the structure of the upper beach. When vegetation is removed, the coastline becomes more vulnerable to erosion, which in turn reduces the suitability of the beach for turtle nesting. Sea turtle conservation on the Dehiwala–Mount Lavinia coastline therefore cannot be separated from broader questions of shoreline management, vegetation protection, and habitat restoration. Active restoration and protection of native coastal vegetation should be treated as an integral component of sea turtle habitat conservation.

(viii) Impact of rising ambient temperature on nest success

Rising ambient temperature emerged as another major concern during the 2026 season. Several nests, both *in-situ* and at the hatchery near the Coast Guard Point, were observed to contain spoiled eggs, partially developed embryos, and dead hatchlings. In addition, even small increases in sand temperature are known to alter incubation conditions, reduce hatchling survival, skew sex ratios, and lower overall nest success. These observations suggest that extreme heat may already be adversely affecting incubation conditions along this coastline.

When sand temperatures approach or exceed approximately 33–34 °C, embryonic development in olive ridley turtles may become compromised. Prolonged exposure to temperatures above this range can reduce hatching success and, under extreme conditions, lead to embryo mortality and nest failure. This aligns with the observations made during the season, including spoiled hatchery nests and two failed *in-situ* nests recorded during the heatwave period coinciding with monitoring activities. At the same time, temperature records from Colombo from 2024 to 2026 show a steady rise in minimum and maximum temperatures, indicating a broader warming trend that increases the risk of lethal incubation conditions and may further skew sex ratios toward females.

These findings underscore the need for systematic collection of temperature-related data in future seasons. Monitoring should assess how temperature affects nest success in both natural and *ex-situ* settings, and the results should guide management decisions. This may include the development of temperature-controlled *ex-situ* conservation sites, along with standardized protocols for nest relocation, egg handling, incubation monitoring, and hatchling release to

improve consistency and resilience across conservation programmes. Future *ex-situ* site design should also incorporate adaptive elements such as shade provision and humidity management to better resemble natural incubation conditions and reduce exposure to climate-related stress.

(ix) Expansion of coastal infrastructure and human disturbance

The expansion of coastal infrastructure, particularly restaurants, along the Dehiwala–Mount Lavinia coastline has significantly increased artificial lighting, noise, and human activity. The placement of tables and semi-permanent structures up to the high-tide line has further reduced available nesting space. Consequently, increased footfall has led to more frequent human–turtle interactions, forcing turtles to nest in suboptimal conditions.

To address these impacts, a combination of regulatory enforcement and habitat restoration measures is needed. Coastal vegetation should be actively restored and expanded using native species to stabilize dunes, reduce erosion, and provide a natural buffer between commercial activity and nesting zones.

Strict planning controls should be enforced to ensure that all coastal developments obtain the necessary environmental and building approvals, with regular monitoring to prevent further encroachment. Structures located within the foreshore zone may benefit from further review in line with existing coastal management and planning guidelines. Beachfront restaurants should also be required to implement proper solid and liquid waste management systems and maintain cleaner coastal environments.

In addition, structured awareness and training programmes should be introduced for restaurant staff and operators, focusing on turtle-friendly practices such as appropriate lighting, visitor guidance, and protocols for responding to nesting events. Together, these measures would help balance coastal tourism with the long-term conservation of turtle nesting habitats.

(x) Pollution, waste disposal, and habitat degradation

Another major concern is the wide range of pollution-related pressures affecting the nesting environment. Improper waste disposal by beachfront restaurants, through garbage burial, burning, and wastewater discharge, has degraded nesting habitats, creating pollution, physical hazards, and disturbed conditions for turtles and hatchlings.

These findings show that sea turtle conservation in this context cannot be approached only as a nest protection issue. Habitat quality is being degraded by multiple forms of pollution, and unless waste disposal and wastewater discharge are properly addressed, improvements in direct nest protection may be undermined by ongoing environmental decline. Strengthened waste management, stricter enforcement against dumping and burning, and better regulation of beachfront establishments are therefore essential components of effective long-term conservation.

(xi) Hatchling entanglement and nearshore threats

Hatchlings remain vulnerable even after successfully emerging from the nest. Several dead hatchlings were found entangled in discarded or active fishing nets near the shoreline, showing that immediate post-emergence survival is affected not only by beach conditions but also by hazards in the nearshore environment.

This observation expands the scope of conservation beyond nest protection and hatchling release. Effective conservation must consider the full sequence of risks faced by hatchlings, from the nest chamber to the shoreline and into adjacent nearshore waters. The presence of fishing nets and other marine debris close to nesting beaches highlights the need for more integrated beach and nearshore management if hatchling survival is to be improved.

(xii) Community outreach and public engagement

Community outreach remains one of the most crucial components of the overall conservation effort. In 2025, volunteers were able to conduct a limited number of outreach sessions that engaged local communities and raised awareness about sea turtle conservation. However, in 2026, such activities were not feasible because of practical constraints.

Moving forward, community engagement should be formalized and expanded through structured training sessions, school-based educational programmes, and organized volunteer initiatives. By empowering local citizens, particularly young people, to become environmental stewards, it is possible to build a stronger grassroots foundation for the long-term sustainability of sea turtle conservation. On an urban coastline where many of the threats arise directly from human activity, public awareness and behavioural change are likely to be just as important as direct intervention on nests themselves.

(xiii) Value of volunteer-based conservation and citizen science

A major strength of Turtle Patrol 2026 was its volunteer-driven structure. Trained volunteers contributed not only to nest protection and hatchling release, but also to systematic observation and data collection. Through regular night patrols, volunteers were able to identify nesting turtles, conserve nests, document environmental threats, and collect spatial and biological data that add long-term value to the programme.

The integration of a stronger research component and more standardized methods has further strengthened the initiative by improving the consistency of records and helping develop a baseline dataset for future conservation planning. This increases the long-term scientific value of the patrol and supports its role as both a direct conservation intervention and a citizen science platform.

(xiv) Limitations and future directions

Several limitations should be acknowledged. The absence of hatchling emergence data from Coast Guard hatcheries limited the ability to assess the hatching success of conserved nests.

Restricted patrol hours meant that nesting events outside the patrol window may not have been recorded. Weather-related interruptions, incomplete sound and light readings, and the practical difficulty of covering the entire beach at all times also introduced unavoidable gaps in the dataset.

At the same time, these limitations clearly indicate the direction for future improvement. Continued standardization of data collection, improved access to hatchery emergence data, more systematic temperature monitoring, and better documentation of nest outcomes would greatly strengthen future patrol seasons. Predictive models derived from historical data may also help forecast climate-driven risks and inform anticipatory management strategies. For scientific uniformity across sites, future programmes should invest in standardized conservation procedures covering nest relocation, egg manipulation, incubation observation, and hatchling release, thereby reducing variability and enhancing reliability.

(xv) Conservation implications

Overall, the findings show that Olive Ridley turtle conservation along the Colombo coastline requires an integrated approach that goes beyond nest relocation alone. *Ex-situ* conservation remains essential under current urban beach conditions, particularly given the risks of poaching, predation, and direct disturbance. However, the long-term viability of these nesting beaches will depend on broader habitat protection and improved coastal management. Severe erosion, rising temperatures, expansion of coastal infrastructure, vegetation removal, pollution, wastewater discharge, and human disturbance are all interacting pressures that affect both turtles and their nesting habitat.

Another important direction is the upscaling and establishment of *ex-situ* conservation locations. These sites should be temperature and humidity-controlled so that they better resemble natural conditions and reduce exposure to threats such as predation, flooding, and manhandling. In addition, climate change poses a severe threat to sea turtle nesting, and future conservation infrastructure must be designed to respond to these realities.

Broader collaboration and stronger policy backing are also essential for scaling up conservation efforts. Building partnerships with government agencies, universities, and non-governmental organizations will allow effective strategies to be replicated more widely across Sri Lanka. Advocacy for coastal protection legislation and the integration of turtle conservation into regional planning mechanisms will help institutionalize these activities. The approaches and outcomes documented over the years from Wellawatta, Dehiwala and Mount Lavinia can serve as a useful model for other coastal regions.

In conclusion, the future of sea turtle protection in the Colombo District depends on a balanced combination of community participation, research, adaptive conservation infrastructure, and sustained policy support. By strengthening and expanding current efforts, it will be possible to develop a more sustainable and effective framework for safeguarding these threatened marine species and the urban coastal habitats on which they depend.

6. REFERENCES

- Binhammer, M. R., Beange, M., & Arauz, R. (n.d.). *Temperature, sex ratios, and nest success in olive ridley sea turtles*. [Unpublished manuscript].
- Chakravarthy, Akshay & Dey, Ashutosh. (2025). Behavioral Responses of Olive Ridley Sea Turtles (*Lepidochelys olivacea*) to Beach Cleaning and Conservation Measures Off the West Coast of India. 10.1007/978-981-97-7324-4_8.
- Ekanayake, E. M. L., Kapurusinghe, T., Saman, M. M., Rathnakumara, D. M. S. N., & Rajakaruna, R. S. (2009). *Effects of lunar cycle on nesting behavior of marine turtles in Rekawa, Sri Lanka. Proceedings of the International Forestry and Environment Symposium, 14, 23–30.*
- Hays, G., Chivers, W., Laloë, J.-O., Sheppard, C., & Esteban, N. (2021). Impact of marine heatwaves for sea turtle nest temperatures. *Biology Letters*, 17.
- IUCN/SSC Marine Turtle Specialist Group. (2008). *IUCN sea turtle conservation guidelines (Version 1.0)*. International Union for Conservation of Nature.
- Lohmann, K. J., Witherington, B. E., Lohmann, C. M. F., & Salmon, M. (1996). Orientation, navigation, and natal beach homing in sea turtles. In P. L. Lutz & J. A. Musick (Eds.), *The biology of sea turtles* (pp. 107–135). Boca Raton, FL: CRC Press.
- Madden, D., Ballester, J., Calvo, C., Carlson, R., Christians, E., & Madden, E. (2008). Sea turtle nesting as a process influenced by lunar phase: A case study with the olive ridley turtle (*Lepidochelys olivacea*) in Costa Rica. *Animal Behaviour*, 75(3), 761–770.
- Miller, J. D. (1997). Reproduction in sea turtles. In P. L. Lutz & J. A. Musick (Eds.), *The biology of sea turtles* (pp. 51–81). CRC Press.
- Pike, D. A. (2008). Natural beaches produce more hatchling marine turtles than developed beaches, despite regional differences in hatching success. *Biological Conservation*, 141(3), 982–991.
- Rajakaruna, R. S. (2023). Coastal developments and sea turtle conservation: Effect of artificial light on female nesting behaviours and hatchling post-emergence migrations. *Ceylon Journal of Science*, 52(3), 239–240
- Ranasinghe, H. M. D. M., & Gunawardena, U. A. D. P. (2024). Attitudes Towards Turtle Conservation: An Island Wide Study in Sri Lanka. *Proceedings of the International Forestry and Environment Symposium*. <https://doi.org/10.31357/fesympo.v27.7020>
- Robinson, Nathan & Stewart, K.R. & Dutton, P.H. & Nel, Ronel & Paladino, Frank & Tomillo, P.S.. (2017). Standardising curved carapace length measurements for leatherback turtles, *Dermochelys coriacea*, to investigate global patterns in body size. *Herpetological Journal*. 27. 231-234.
- Velusamy, T., & Sundararaju, R. (n.d.). Olive ridley turtle conservation activities along the Nagapattinam coast, Tamil Nadu, India.