Bright Future for Olive Ridley Turtles?

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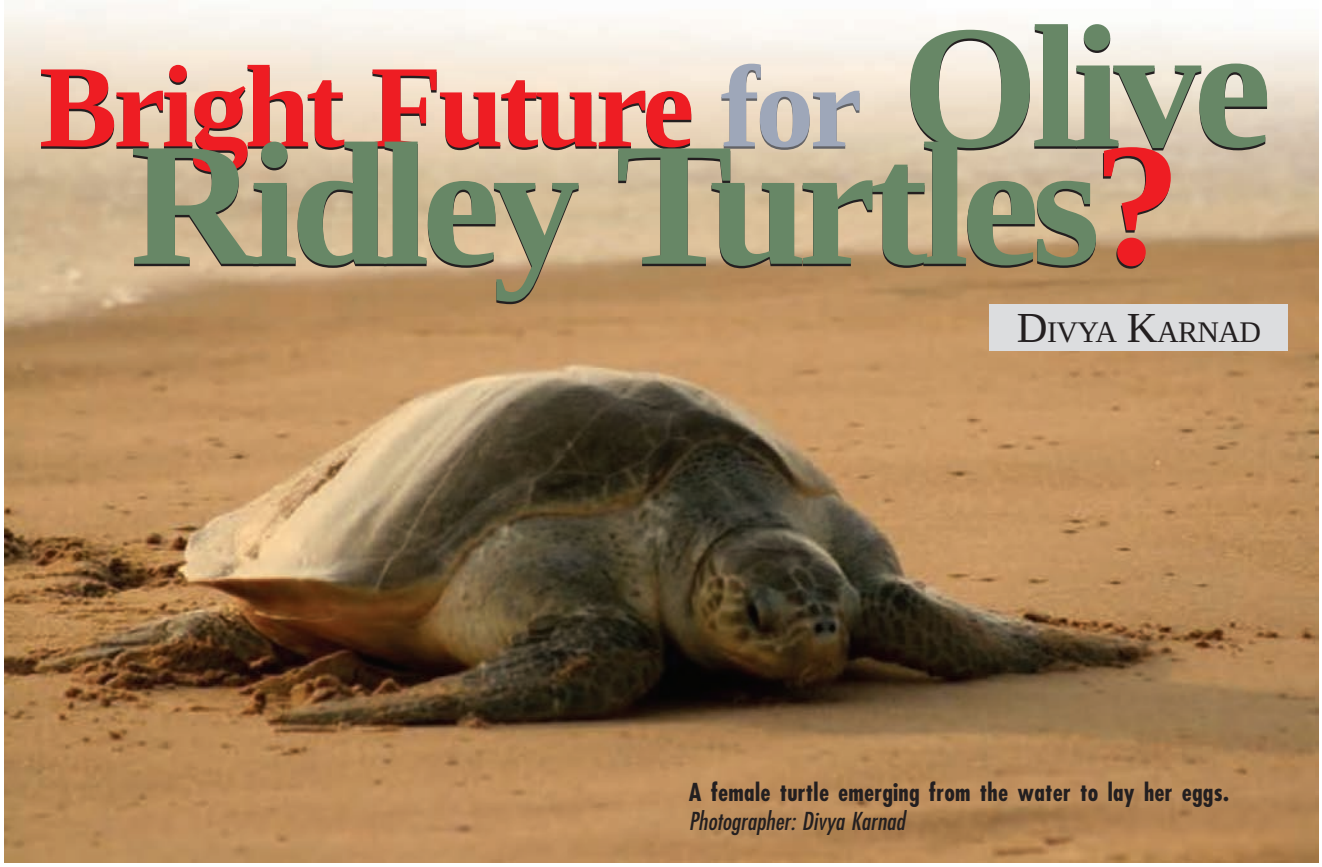

A female turtle emerging from the water to lay her eggs.
Photographer: Divya Karnad

The future of the olive ridley turtles would be bright only if lights in the coastal areas were to be dimmed by a shade. Bright lights in and around coastal areas are leading these turtles to their death.

WAVES crash against dark sands as a sea turtle finds a suitable spot on a beach and starts to dig. Its shell camouflages well, but it is possible to discern the distinctive olive ridley turtle. Beaches all across India host these important visitors for a few months of the year. They are ancient mariners who come ashore to lay their eggs.

There are four turtles that regularly nest on Indian shores, namely, the leatherback (*Dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), green (*Chelonia mydas*) and the olive ridley turtle (*Lepidochelys olivacea).* Additionally, a few loggerhead turtles (*Caretta caretta*) are also found in Indian waters. The olive ridley is the most widespread nester, coming ashore from the coast of Gujarat to West Bengal. In Odisha, the olive ridley nests in the thousands, in a process called mass nesting.

Under cover of darkness they lay eggs in sand nests that they dig, filling it up and disguising it by dancing atop to flatten and destroy all evidence. They then return to the sea, not to see land again for the next 2-3 years. Over 45 days, the eggs that have been protected by the warm nest, get restless. Baby sea turtles hatch and make their way to the surface, amidst a sea of flippers and eggshells.

Olive ridley turtles do not show parental care and only their instincts help the hatchlings survive. On emerging, they are suddenly exposed to the cool night air, the light of the moon and stars on the water, and the dark shadows of the land. Clumsy and slow on land, their chances of survival are improved once they make it into deep water. However, they have to face many obstacles before they can reach safety.

Being cold blooded, their body temperature is dependent on their surroundings. Under harsh sunlight, their delicate bodies overheat and desiccate. Their shells are soft, allowing predators like jackals, hyenas, crabs and crows to easily snack on them. Running the gauntlet of these threats, olive ridley hatchlings find the sea using special visual skills. They follow the glow from reflected moonlight and starlight.

Unfortunately, coasts have changed over time. Humans have densely populated beaches and turned night into day, lighting up houses, offices, streets and billboards. The night sky has turned into a nightmare for baby turtles. With an artificially bright horizon in a direction opposite to the sea, olive ridley hatchlings waste precious energy reserves heading in the wrong direction. They are either desiccated by the sun or run-over on roads, if they are not eaten by predators. Generations of turtles will be misled and killed, if nothing is done to reduce night lights.

There have been a few studies on the effects of beachfront lighting on turtles, most originating in the USA. These studies did not focus on how olive ridley turtles perceive light. Indian scientists such as Bivash Pandav, Basudev Tripathy and those from the Odisha Forest Department showed that turtles hatching along the Odisha coast were also affected by light. Yet, there were no studies about what types of light impact, and what could be

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done to reduce their effect. Such studies have become more important in light of the declaration of several coastal SEZ's (POSCO plant) and the development of ports (the one at Dhamra, close to the famous Gahirmatha olive ridley mass nesting beach).

My research work on the Rushikulya mass nesting beach in southern Odisha was focused on the issue of beach lighting and olive ridley hatchling disorientation. This work was done in consultation with Dr Kartik Shanker and Dr Kavita Isvaran, from the Indian Institute of Science and Dr Chandrasekhar Kar from the Odisha Forest Department. We tested lights of different wavelengths (colours) and intensities on the turtles to determine whether they preferentially move towards certain kinds of light. Repeating these experiments on different days, in different areas, we saw a pattern. While light at the higher end of the spectrum, UV and violet, attracted the turtles, lights at the lower end, orange and red, did not seem to affect them. Other species of sea turtles also show this lack of response towards orange-red light.

NASA's image of India at night indicates how brightly lit the coastal regions are.
Source: http://visibleearth.nasa.gov/view_rec.php?id=1438

My study also determined the effect of available light on the hatchlings, and whether they were sensitive to light from great distances. A previous study at Rushikulya had found more than 80% of the hatchlings moving towards the land, in response to light from a single industry within 2 km of the beach. We observed the movements of hatchlings at different locations on the beach, due to lights from a village and a highway, with one section shaded by forest. We saw a difference in the reaction of the little turtles in response to these different lights. The village lights emanating from about 3 km away misguided more than 60% of the hatchlings. The hatchlings also reacted to the occasional well-spaced streetlights from a highway between 4 and 6 km away. Comparing these results to the amount of light we expect from even a medium sized port tells us that the situation is dire.

We must, therefore, find ways to prevent lights from affecting turtles. During the study, we tested the effectiveness of the forest and other barriers in cutting lighting on the beach. We found that natural light-masking mechanism, such as coastal forests or tall sand dunes, allowed olive ridley hatchlings to orient naturally and find their way to the sea. Natural beach vegetation not only acts as a sand-dune builder but also deters errant turtles and helps them re-orient towards the sea. Allowing natural sand dunes to develop is a good way to protect turtles.

Our study has allowed a greater focus to be placed on the issue of artificial lighting in India and how it could affect the world of our nocturnal animals. Small steps such as drawing curtains or turning off outside lights in beach houses will prevent light from spilling onto the beach, using monochromatic bulbs at the lower end of the spectrum (orange, red) will also help night-loving wildlife such as sea turtles. Allowing beach vegetation to build sand dunes and preventing sand alteration will help. Ports or industries could use lightproof walls or screens, as well as lampshades that mask light on the seaward side to contain artificial light. By modifying the wavelength of the bulbs to monochromatic orange and encouraging ground-embedded lights on roads we will see a significant decrease in disoriented hatchlings.

These simple solutions require planning and commitment to implement, and they have already begun. The Dhamra Port Authority has agreed to use more turtle-friendly lighting in their premises. The Chennai Corporation has agreed to shut off bright beach lighting during the turtle-nesting season. Further government action should be encouraged by citizens. As awareness of this issue grows, citizens should encourage each other to act against brightly lit beach houses or coastal roads. Together we can plan for a dimmer future to ensure some hope for threatened species such as the olive ridley turtle.

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