Shoreline changes of sea turtle nesting beaches along the Southern coast of Sri Lanka

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Out of seven species of sea turtles in the world, Hawksbill (*Eretmochelys imbricate*), Olive Ridley (*Lepidochelys olivacea*), Green Turtle (*Chelonia mydas*), Loggerhead (*Caretta caretta*), and Leatherback (*Dermochelys coriacea*) are nesting in different beaches along the Southern coast of Sri Lanka. The characteristics of the shoreline determine the nesting behaviour of sea turtles. Therefore, the study focused on the estimation of shoreline changes at nine selected turtle nesting beaches for a period of 17 years from 2005 to 2021. Sentinel-2 high resolution satellite images were used to study the changes in shoreline using GIS (Geographic Information System) and remote sensing techniques. Digital Shoreline Analysis System (DSAS) in ArcGIS was applied to calculate the rate of shoreline change. Ground-truthing was conducted by field observations and drone images from a 48MP inbuilt camera of DJI Mavic Mini over 20 m from the ground for the year 2022. The results revealed that the average coastal erosion rates as -1.34 ± 0.36 m yr^{-1} in Palatupana (2005-2021), -0.05 ± 0.21 m yr^{-1} in Ussangoda (2009-2021), -0.41 ± 0.95 m yr^{-1} in Rekawa (2006-2020), -0.20 ± 0.19 m yr^{-1} in Mirissa (2010-2021), -1.98 ± 0.35 m yr^{-1} in Bundala (2009-2021) and -0.78 ± 0.54 m yr^{-1} in Kosgoda (2005-2021). Average coastal accretion rates were recorded as 2.82 ± 2.23 m yr^{-1} in Godawaya (2005-2020), 0.66 ± 0.85 m yr^{-1} in Kalametiya (2009-2021) and 0.39 ± 0.73 m yr^{-1} in Habaraduwa (2011-2021). Bundala had the highest average erosion rate while Godawaya had the highest average accretion rate. Therefore, sea turtle nesting habits in Palatupana, Ussangoda, Rekawa, Mirissa, Kosgoda, and Bundala coastal areas could be negatively affected by erosion. Godawaya, Kalametiya, and Habaraduwa coastal areas could be positively affected by accretion.

Keywords: accretion, erosion, GIS, sea turtles, turtle nesting

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