Leatherback sea turtle movements in the South Pacific

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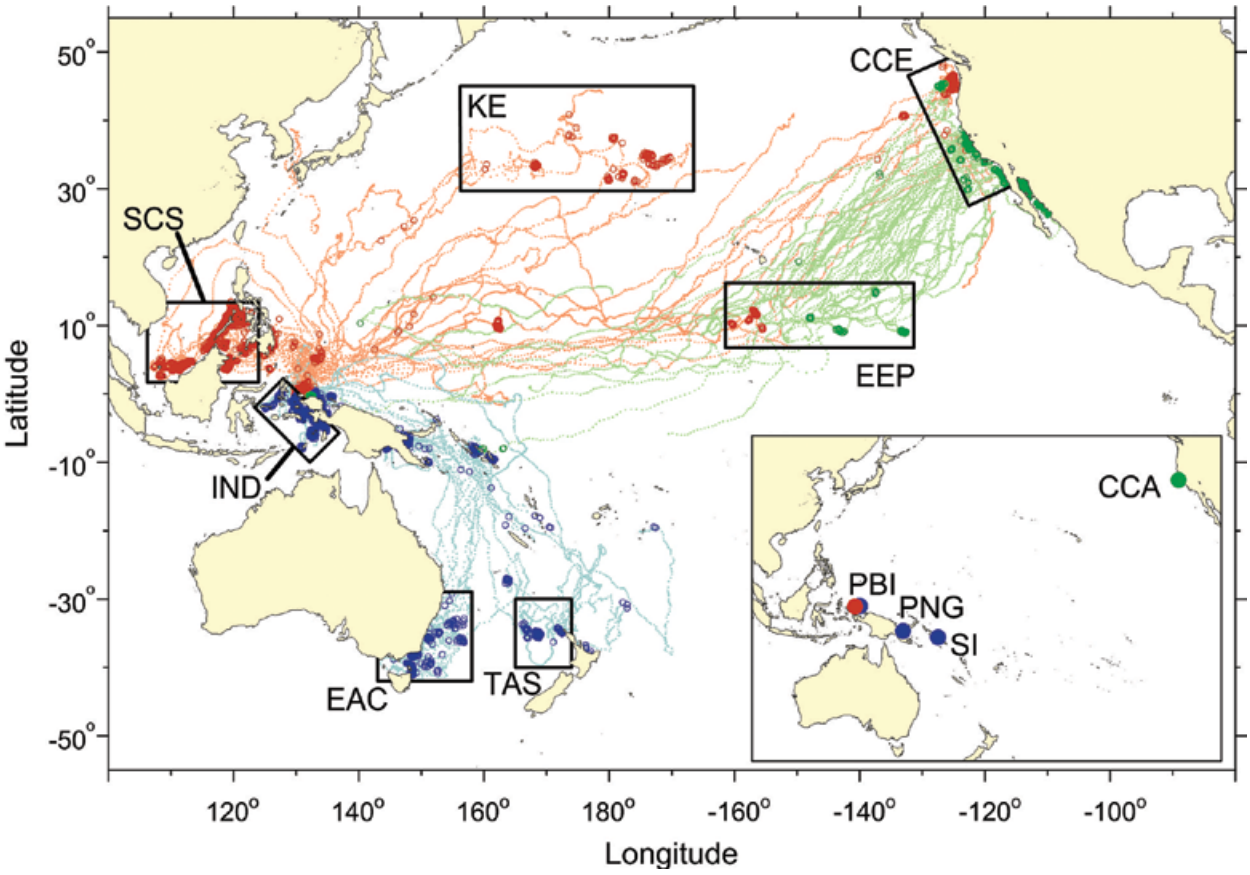
Sea turtle conservation efforts often focus on protecting hatchlings on nesting beaches, yet foraging and migration behavior in the water may put them directly in the path of fishing boats. Reducing at-sea mortality risk is a priority for endangered Pacific leatherback turtles. In a recent study, leatherback migratory patterns and high-use areas were assessed in an effort to characterize foraging habitat and to minimize the potential for harmful encounters with humans.

Drawing together scientists from the United States, Indonesia, Papua New Guinea (PNG) and the Solomon Islands (SI), it was possible to produce a large-scale picture of Pacific leatherback foraging and migration behavior in the Southern Pacific. The study focused on the western Pacific leatherback stock that is known to nest in Papua Barat Indonesia (PBI), PNG, SI, and Vanuatu. Satellite-linked transmitters were attached to turtles in 1) PBI on the beaches of Jamursba-Medi and Mermon along the northern Bird Head coast; 2) PNG on the beaches of the Kamiali Wildlife Management Area and Maus Buang along the Huron Gulf; and 3) SI on beaches in Santa Isabel Island and Rendova Island. The satellite-linked transmitters, which were attached with a flexible shoulder harness, relayed the locations of sea turtles as they moved from their nesting beaches to foraging grounds in the Pacific. Transmitters were designed to provide tracking information for up to two years on each turtle. Location information was collected on 126 leatherbacks from 2000 to 2007.

The study identified patterns of movement and critical foraging habitat for post-nesting leatherbacks nesting in PNG and SI. Analysis of leatherback movements revealed that the turtles in the South Pacific travel to areas with oceanographic features conducive to jellyfish concentrations, the main prey of leatherbacks. Leatherbacks nesting along PNG's Huron Gulf coast used the gulf's waters extensively from December to February while moving between nesting activities. After the nesting season, PNG leatherbacks move southward, swimming through the Coral Sea to access the Tasman Sea or the western South Pacific Ocean. Similar to movements of PNG leatherbacks, turtles nesting in SI remained

Harness and transmitter fitted on a leatherback turtle (Image: Scott Hansen).



Probable transit of 126 tagged leatherback turtles.

- *Large, darker circles indicate area restricted search (ARS) behaviour; small, lighter dots indicate transiting behaviour.*
- *Colour of track indicates deployment season: red = summer nesters, blue = winter nesters, green = deployments at central California foraging grounds.*
- *Inset shows deployment locations; PBI = Papua Barat, Indonesia, PNG = Papua New Guinea, SI = Solomon Islands, CCA = central California.*
- *Black boxes represent ecoregions for which habitat associations were quantitatively examined (see text): SCS = South China, Sulu and Sulawesi Seas, IND = Indonesian Seas, EAC = East Australia Current Extension, TAS = Tasman Front, KE = Kuroshio Extension, EEP = equatorial eastern Pacific, and CCE = California Current Ecosystem.*

around the islands from December to February. Upon leaving SI waters, the turtles moved towards the coastline of southeastern Australia and northwestern New Zealand for foraging.

Mapping the movement of leatherbacks in the Pacific can inform fishers and fisheries managers to help minimize harmful or fatal interactions. During the study, 7 of the 126 tracked leatherbacks were killed either incidentally or intentionally by humans.

Protecting sea turtles across large migratory and foraging areas can be challenging due to demands on resources in these areas. Relatively small time-area closures of the marine areas associated with nesting activities could provide effective protection during nesting periods in PNG and SI. The results of this study can inform the development of conservation measures designed to protect breeding leatherbacks during the nesting season.

A leatherback turtle taking a breath (Image: Scott Benson).