

Building our Knowledge *of the* Leatherback Stock Structure

The key to any successful business is understanding the nature and nuances of its clientele. Similarly, as sea turtle conservationists, we must know who our “clients” are as intimately as possible in order to be successful in our mission. The current taxonomy of the world’s sea turtles describes only seven species, yet just as there are a multitude of human races within the species *Homo sapiens*, we find that each species of sea turtle comprises numerous populations or stocks. For the leatherback turtle, the sole surviving species of its family, we are beginning to understand the stock composition as a result of recent research



Leatherback hatchlings make their way from nest to sea. © SUZANNE LIVINGSTONE / UNIVERSITY OF GLASGOW

Most people think of sea turtle populations in terms of the nesting beaches where adult females lay their eggs. Indeed, global population estimates for sea turtles are most commonly determined and monitored by counting the number of females or of nests laid, and from these beach data we see that some populations have declined dramatically, while others are stable or increasing. Conservation efforts, however, cannot focus on nesting beaches alone; nor can mere nesting beach data provide us with a full understanding of turtle populations, since they tell us nothing about younger life stages or about male turtles. Furthermore, while it is now generally accepted that sea turtles return to their natal beaches to breed, the precision of this natal homing behavior varies between different species, populations, geographic areas, and probably even individuals. It is also important to understand the linkages between the various habitats where leatherbacks are found and the nesting beaches where these turtles originate and return to reproduce—not only to have a more holistic understanding of their life histories, but also potential impacts of human-induced and to assess the natural threats on different populations.

These complexities of sea turtles’ life histories complicate the task of drawing precise boundary lines around each stock. And although current means of studying stock structure are limited on their own—such as molecular genetics, tagging, and satellite telemetry—limitations can be overcome when these tools are employed together.

As seen in the figures on page 11, leatherback turtles in the Pacific appear to be of two main, distinct genetic stocks: an eastern Pacific stock made up of nesting aggregations (rookeries) in Mexico, Costa Rica, and other parts of central America; and a western Pacific stock made up of rookeries in Papua, Indonesia; Papua New Guinea; and the Solomon Islands. A possible third Indo-Pacific stock in Malaysia may also exist—a stock that now may be almost extinct. Genetic results, coupled with tag-recapture and satellite telemetry data, thus far suggest that leatherbacks that breed in the western Pacific feed and grow in the northern Pacific, while animals from the eastern Pacific stocks generally forage in the southern hemisphere, including the waters off Peru and Chile. However, this pattern is not exclusive, since animals of western Pacific stock origin have been found off Chile and in other



This figure shows the known genetic stocks for leatherback sea turtles. Solid colors indicate the location of major rookeries for known distinct genetic stocks, while the hatched colors mark rookeries for which the genetic stock is not yet fully defined or its boundaries unclear. One distinct stock, in Malaysia, may no longer exist, and the genetic structure of rookeries in the Indian Ocean remains unknown. © CONSERVATION INTERNATIONAL AND ROWE DESIGN HOUSE

areas of southeast Asia and the southern Pacific and while less common, some leatherbacks of eastern Pacific stock origin are found in the northern Pacific.

In the Atlantic, the nesting assemblages in French Guiana, Suriname, and Trinidad have been identified as one distinct genetic stock based on mtDNA and nuclear data. This is also consistent with tagging data. Costa Rica (Tortuguero and Gandoca beaches) appears to constitute a distinct stock, although it is unclear where the boundary between Costa Rica and the Guiana/Trinidad stock falls, since rookeries in between (Venezuela, Panama, and Colombia) have not yet been surveyed. This boundary may be somewhat difficult to delineate, since there is likely to be dispersal, from Costa Rica on the one side and from the Guianas on the other, into an area of overlap. A northern Caribbean stock has also been identified from genetic data from St. Croix, although the boundary is also unclear.

West Africa (the eastern Atlantic) appears to be distinct based on data from Gabon, as is the South Africa rookery in Natal. Tagging and genetic studies so far show that leatherbacks found in the waters of the North Atlantic are part of the western Atlantic

genetic stocks, while some preliminary tag returns show that leatherbacks from West Africa forage off the Atlantic coast of South America. South African leatherbacks have been tracked from nesting beaches in Natal, around the Cape of Good Hope, into the South Atlantic. The stock structure of Indian Ocean rookeries is unknown, although it is likely that the rookeries identified in Sri Lanka and the Nicobar Islands are part of a distinct Indian Ocean stock.

Research using tagging, telemetry, and genetics will continue to shed light on the complexities of stock assessments for all seven species of sea turtles worldwide. This intimate understanding of the structure of turtle stocks and of which key habitats are important to their continued existence is critical to our efforts to prevent extinctions of these endangered species.

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