CONSERVATION:

THE TRANS-PACIFIC JOURNEY OF THE LEATHERBACK TURTLE

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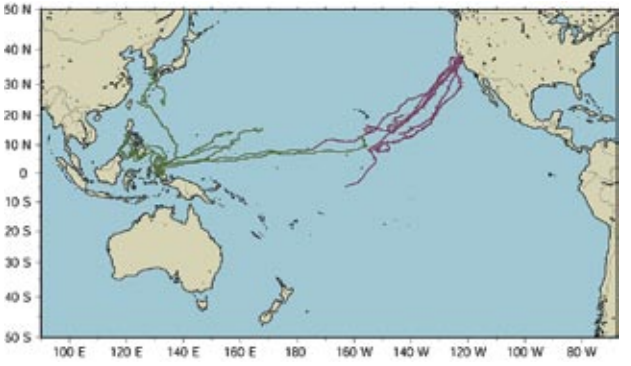
The Pacific leatherback turtle (*Dermochelys coriacea*), a seasonal visitor to the central California coastal waters between Pt. Sur and Pt Arena, is listed as a critically endangered species on the World Conservation Union (IUCN) Red List. Sightings of leatherbacks occur within the central California sanctuaries primarily during late summer and fall when they arrive at our coastal waters to exploit large aggregations of their jellyfish (Scyphomedusae) prey. Although the leatherback is the largest living reptile, it is cryptic at sea and sighted mainly by those who work on the water (fishers, marine scientists, and whale-watch operators).

Leatherbacks nest at beaches in tropical latitudes, and it was long thought that the local visitors originated from nearby colonies in Mexico and Costa Rica. In the late 1990s, however, DNA analysis of skin samples from stranded turtles and those caught incidentally in U.S. fisheries revealed that West Coast leatherbacks were in fact nesting at beaches in the western Pacific (Indonesia, Papua New Guinea [PNG], and the Solomon Islands). In September 2000, collaborating with Dr. Scott Eckert, who pioneered satellite tag attachment methods, we successfully captured two free-swimming leatherbacks in Monterey Bay and released them with satellite-linked transmitters. The telemetry data confirmed the results of the DNA analysis: leatherbacks encountered off central California originate from western Pacific nesting beaches.

Since 2000, we have tagged 29 additional leatherbacks within the Monterey Bay and Gulf of the Farallones National Marine Sanctuaries and 43 at western Pacific nesting beaches. The results of these tagging efforts have revealed that leatherbacks in the western Pacific region, although considered a single genetic stock, comprise multiple foraging populations. Turtles that nest during the winter months undertake migrations to the south, while those that nest during summer months move to northern foraging grounds (including the North American west coast; see figure at right). The combined results have fundamentally changed the scope of conservation efforts for leatherback turtles found off the U.S. West Coast.

The Recovery Plan for the Pacific leatherback identifies key areas of research and conservation that will be necessary to ensure the survival of the leatherback, including: 1) identifying stock ranges; 2) determining movement patterns and foraging habitat; and 3) censusing and protecting



(above)
Satellite-tracked leatherback movements from nesting beaches in Papua, Indonesia (green tracks) and from foraging areas off the California coast (purple tracks) in 2003-2004

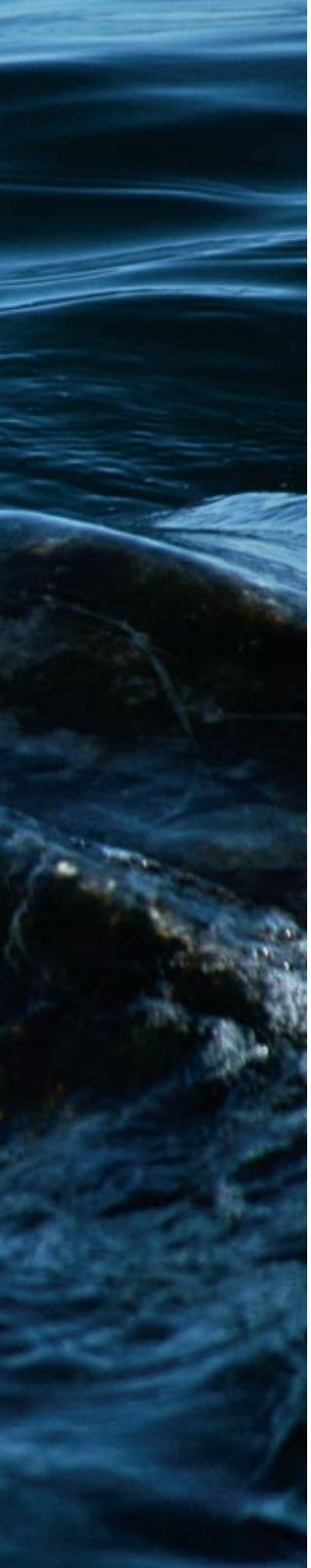
(right)
Hatchling leatherback turtle (photo © Jim Abernethy)

nesting populations. In particular, protecting nesting beaches has been proven to work in restoring sea turtle populations. In the Gulf of Mexico, nesting beach protection was effective at halting the extinction of the Kemp's Ridley, one of the most critically endangered sea turtles in the world during the 1970s. The huge effort, combined with additional measures to protect ridleys from coastal fishery mortality, resulted in the gradual recovery of the species during the 1990s. Long-term nesting beach protection has also resulted in increases of once depleted leatherback populations in the Caribbean; however, egg protection alone may be insufficient to reverse the severe declines in the eastern Pacific leatherback rookeries in Mexico and Costa Rica, and it did not prevent the extinction of the Malaysian rookery at Terengganu. It is clear that a holistic approach will be required that also addresses at-sea threats.

In 2003, a landmark meeting in Bellagio, Italy, brought together a group of biologists, economists, legal scholars, conservationists, and fishers from around the Pacific to develop a new multidisciplinary approach to dealing with declining sea turtle populations. The Bellagio Blueprint for Action on Pacific Sea Turtles calls for a massive mobilization to protect all remaining nesting sites around the Pacific from unsustainable human harvest, predation, and habitat destruction. Additionally, threats at sea must be reduced by strengthening and coordinating existing Pacific conservation and fisheries treaties, and facilitating transfer of new turtle-friendly fishing technologies to multi-national fishing fleets.

To meet these goals, we have expanded our work to include not only local research on leatherbacks off central California, but also a variety of conservation and research initiatives in western Pacific island nations. We recently conducted aerial surveys in West Papua (eastern Indonesia) and PNG that showed large numbers of nesting leatherbacks remaining only on a few beaches in Papua, underscoring the need to protect these last rookeries in the Pacific before it is too late. Efforts to establish coordinated and sustained nesting beach conservation are now getting underway in Papua and throughout the western Pacific. With the help of local community-based organizations, government and university biologists, and Word Wildlife Fund researchers, we are training local villagers to monitor the nesting beaches, evaluate hatching success, and attach satellite-linked transmitters to nesting turtles. A cooperative international program involving local villages and non-governmental, governmental, and fishery management organizations has recently been established and is gaining momentum. These new developments have inspired cautious optimism about the future of the western Pacific leatherback.

Known by different names throughout beaches in the western Pacific—*trousel, penyu-belimbing, leddebak, tabob*—the leatherback has long been an important part of local cultures and traditions. With new awareness that



"their" turtles travel to other locations near and far across the Pacific, our colleagues in PNG and West Papua are now working with a broad international community to ensure the survival of the leatherback for future generations.

Nearly seven thousand miles from their tropical western Pacific natal beaches, coastal California waters are among the most distant foraging grounds of the western Pacific leatherback. Upon completion of their trans-Pacific Ocean odyssey, leatherbacks arrive to gorge on abundant brown sea nettles and moon jellyfish. An innovative tagging technique developed by Dr. Jim Harvey at Moss Landing Marine Laboratories is revealing the secrets of leatherback foraging behavior at this remote temperate feeding area. Time-Depth Recorders and video cameras attached with suction cups to free-swimming turtles are providing unique information about consumption rates and diving behavior, and elucidate the appeal of these waters to western Pacific leatherbacks.

Within the coastal central California ecosystem, foraging populations of leatherback turtles are relatively safe; however, "our" turtles will remain at risk unless we are able to expand our understanding of the entire ecosystem inhabited by these highly-mobile marine reptiles. Leatherbacks inhabit an ecosystem that includes not only the coastal waters of central California, but extends across the Pacific Ocean, nearly one third of the way around the globe. In this case, ecosystem management requires a broad scope to achieve successful conservation of this species at all foraging grounds, nesting beaches, and on the migratory routes that connect them.

As they say in Papua New Guinea, *Yumi mas lukautimi gud, trousel blong ol pikinini i kam behain*—"We must take care of the turtles, for they belong to the children of the future."

Research was conducted under ESA Scientific Research Permit No. 1227-03

For more information on leatherback research and conservation, visit: ***http://swfsc.noaa.gov/***

all photos this spread: Eli Woolery

(left)

Leatherback turtle surfaces in Monterey Bay, California. The bright pink and orange spot on the head is the location of the pineal gland, a light-sensitive organ which may aid the turtle in navigation.

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(right, from top)

Researcher Scott Benson prepares for tagging.

This leatherback turtle is about to be tagged with a temporary suction cup tag that will provide short-range tracking information, as well as diving profiles.

Surfacing leatherback with tag attached.