TRACKING HABITAT USE AND LIFE HISTORY PATTERNS OF EAST PACIFIC GREEN TURTLES (*CHELONIA MYDAS*) USING STABLE ISOTOPE ANALYSIS WITH SKELETOCHRONOLOGY*

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The green turtle (*Chelonia mydas*) population in the Eastern Pacific Ocean is listed as endangered on the IUCN Red List and by the U.S. Endangered Species Act. Once the target of a large fishery that peaked in the 1970s, this population is gradually recovering, and, despite decades of ongoing research, much of these turtles' complex life history remains unknown. Elucidating the duration of time turtles spend in distinct habitats – particularly in the remote pelagic habitats of the Eastern Pacific – is critical to successful conservation as threats and management strategies vary greatly between coastal and open ocean habitats. Here we describe the general patterns of habitat use by Eastern Pacific green turtles among sequential years, obtained by a novel method combining stable isotope analysis with skeletochronology. Our goal is to determine the duration of the pelagic juvenile stage (i.e., the "lost years") of green turtles in the Eastern Pacific and improve understanding of green turtle ontogeny. We first applied skeletochronology to identify and measure annual growth marks in cross sections of turtle humeri. Using this technique, we also estimated the size (curved carapace length, CCL) of the turtle at each incremental growth mark. Sequential bulk bone samples were then micromilled for stable isotope analysis. We then identified habitat use over time by comparing stable carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) isotope values of sequential humerus bone growth layers. The $\delta^{13}C$ and $\delta^{15}N$ values reflect a turtle's geographic location and diet because isotopes vary between habitats ($\delta^{13}C$ varies between neritic vs. oceanic, northern vs. southern latitude, and pelagic vs. benthic habitats) and trophic levels ($\delta^{15}N$ becomes enriched with each trophic step). Analysis of both $\delta^{13}C$ and $\delta^{15}N$ gradients in bone layers allows us to predict turtle foraging and movement patterns over time, including potential habitat shifts. For this turtle population, we identify ontogenetic shifts from the pelagic juvenile stage to the neritic juvenile and adult stages. Results from 14 green turtles (CCL 51 - 95 cm) collected from beach strandings along the Pacific coast of Baja California, Mexico from 2004 – 2011 are included in this analysis and the $\delta^{15}N$ values of the bulk bone tissue show trends in trophic level that appear to correlate with life stages, growth rates and ontogenetic shifts. The mean $\delta^{15}N$ values of new recruits and subadult turtles (estimated CCL < 70cm) were significantly higher than the $\delta^{15}N$ values of adult-sized turtles (estimated CCL > 70cm), 15.9 ± 2.0 ‰, and 13.0 ± 0.9 ‰ (mean ± SD) respectively, $p<0.0001$. These results support the hypothesis that juvenile pelagic and newly recruited green turtles forage omnivorously and at a higher trophic level, which can support more rapid growth, than adult neritic turtles. This approach grants us insight into patterns of habitat use and ecology of Eastern Pacific green turtles over time. Acknowledgments: We thank the International Sea Turtle Society, U.S. Fish and Wildlife Service, U.S. National Marine Fisheries Service, Ecoteach, Defenders of Wildlife, Sea Turtle Conservancy, Lotek, Sirtrack, Telonics, CLS America and UCSD for providing assistance to attend the 33rd Symposium.

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