

EVALUATION OF REMIGRATION INTERVALS AS INDICATORS FOR HOW WELL SEA TURTLE POPULATIONS FULFILL THEIR ECOLOGICAL ROLES

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Sea turtles have specialized feeding habits and affect other marine species through predation/consumption and indirectly through nutrient recycling and food competition. The food web connections between sea turtles and other species mean that changes in sea turtle abundance may have effects throughout the marine ecosystems they inhabit. To restore healthy marine ecosystems, conservation goals necessarily must include sea turtles recovering to fulfill their ecosystem roles. Pristine sea turtle populations that fulfilled their ecological roles were most likely food limited whereas current populations are recruitment and survival limited. One approach to determine how well sea turtles fulfill their ecological roles is to estimate historical population size and compare it with current population size. Historical population estimates, however, are based on extrapolations from small to large scales and, hence, are prone to large errors. Alternative indicators of how well sea turtles fulfill their ecological roles are therefore highly desirable. Sea turtles are capital breeders and remigration interval depends on available food quantity and quality. Remigration intervals therefore partly reflect the strength of intraspecific competition and could potentially be used as indicators for how close populations are to fulfill their ecological roles. We use long-term data from Tortuguero to evaluate if remigration intervals are good indicators. Green turtle remigration interval appears to have increased with nesting since 1971 but results could be confounded by variation in tag loss, encounter and annual survival probabilities as well as by variation in marine productivity on the foraging grounds. Historical declines may explain the shorter remigration intervals of Tortuguero green turtles than for less exploited populations in Hawaii and Australia but the difference could also be caused by Atlantic and Pacific climate cycles creating selection pressures that favor different life history strategies. Tortuguero hawksbill turtles have declined and remigration intervals appear to have decreased but sample size is small. The same confounding factors apply as for the green turtle population. Tortuguero leatherback turtles have shorter emigration intervals than Pacific leatherbacks, probably due to differences in available food quality and quantity, linked to differences in oceanic productivity and climate cycles. We conclude that remigration intervals may indicate how well green and hawksbill turtles fulfill ecosystem roles but they appear less useful as indicators for leatherbacks due to large environmental variation in their foraging habitats. Research of factors affecting the quality and quantity of available food and how these factors differ between