
A DEMOGRAPHIC APPROACH TO DETERMINE EFFECTS OF ANTHROPOGENIC MORTALITY AT THE POPULATION LEVEL - IF WE HAD A LITTLE BIT MORE DATA*

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Determination of possible negative effects of anthropogenic deaths to an animal population is important for successful management. The additional mortality to a population caused by humans, intended or unintended, may or may not affect the population as a whole depending on a variety of factors. Simply put, if the additional mortality is less than the rate at which the population is growing, the net growth rate will be positive albeit at less than the maximum possible rate. It is well-understood that deaths of certain age groups have more significant consequences to the population than the other age groups. Consequently, it is useful to know how known anthropogenic deaths may affect the future growth of the population. It is also useful to know what may be the limit of such additional deaths that causes the population growth rate to be negative. This concept has been used for some taxa, e.g., marine mammals in the US. This task may be a simple exercise when we have data on both demographic parameters and anthropogenic mortality and their variability. When data are limited, however, it can be a challenging mission. A matrix population model was created to simulate a hypothetical pristine turtle population. The population, then, was subjected to various additional mortalities for combinations of age classes. Through these simulations, I show that long-lived and late-maturing species, such as marine turtles, do not have much room for additional mortality to keep a population from declining. I will also show that there may be a lag between the true change in population size and the observed population trend, especially when a small portion of the total population is monitored. Finally, I will make a list of recommendations for what kind of data are necessary in order to make sound management decisions for marine turtles.

A DECLINING TREND OF NESTING FREQUENCY OF SEA TURTLES AT THE LARGEST ROOKERY IN SRI LANKA

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Rekawa rookery, located in the south coast, is the largest sea turtle rookery in Sri Lanka visited by all five species that nest in Sri Lanka (Green, Leatherback turtles, Loggerhead turtles, Hawksbill turtles and Olive ridley turtles). The in-situ nest protection programme at Rekawa was initiated in September 1996. The beach was patrolled 24 hours per day and 365 days per year. The hatchlings were naturally released to the sea. Nesting data were collected until July 2000 when the in situ protection programme was terminated due to lack of funding. However, it was re-started March 2005 and in August 2006 Rekawa beach was declared as the first marine turtle sanctuary in Sri Lanka. Between July 2000 and March 2005, we estimated by interpolation the number of nests laid when there was no monitoring. There were 973 nests observed from September 1996 to August 1997 and only 375 nests were observed from September 2009 to August 2010 (about 96% were green turtles), suggesting a >60% decline in the turtle population nesting at Rekawa. For at least three decades prior to 1996, we suspect that nearly all freshly laid eggs in Rekawa were harvested for human consumption. Therefore, we presume that there has been little or no recruitment into the Rekawa populations for at least 30 years. If the turtle hatchlings released after 1996 represented a restart of turtle recruitment, we suspect that they will begin return to Rekawa as nesting adults format some point between 2026 to 2046 (assuming that, like other regions, green turtles in the Indian Ocean take 30 to 50 years to reach maturity). Recent development of the Hambantota International harbour only 30 km away from Rekawa, heavy sea traffic and other anthropogenic activities represent increasing potential threats for the remaining turtle population at Rekawa. We would like to acknowledge to the International Sea Turtle Society, Western Pacific Regional Fishery Management Council, U.S. Fish and Wildlife Service, and U.S. National Marine Fisheries Service, the International Sea Turtle Symposium and National Science Foundation, Sri Lanka for there support to attend to the symposium.