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### Testing MacArthur's Latitude-Niche Breath Hypothesis on Sharks from the Poles to the Equator

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## Testing MacArthur's Latitude-Niche Breadth Hypothesis on Sharks from the Poles to the Equator

In terrestrial environments, species diversity tends to increase from the poles to the equator and MacArthur's Latitude-Niche Breadth hypothesis has become one of the universally accepted explanations for this phenomenon. MacArthur's hypothesis states that species in the tropics experience greater stability across seasons than species at the poles due to relatively constant temperature regimes and primary productivity at low latitudes. As a result, tropical species can occupy smaller niches (defined as the environment and diet of the organism). Consequently, a larger diversity of species can inhabit the same niche area in the tropics, when compared to the poles. However, few studies have been conducted that actually test MacArthur's hypothesis and even fewer studies have examined if it holds true in the marine environment. In fact, preliminary results have indicated that instead of inhabiting larger niches, as expected based on MacArthur's hypothesis, shark species at the poles actually experience much smaller niches than their counterparts at the equator. Thus, the purpose of this project is to test MacArthur's Latitude-Niche Breadth hypothesis in the marine environment by utilizing stomach content data of sharks in conjunction with location to estimate niche size and niche overlap. This will be accomplished by systematically comparing stomach content data of sharks that range from studies performed at the poles to those at the equator. Stomach content data is appropriate for this task since it provides specific prey items by number, mass, and frequency that were recently eaten by the shark. As a result, it can be utilized to determine the diversity of species consumed. The primary aim of this project will be to determine the niche sizes of various shark species. Then, using MacArthur's and Levin's measure and accounting for the body size of each species, variation in niche size and niche overlap will be examined with respect to latitude. Ultimately, the findings from this project on niche size and niche overlap will provide further insight into determining the ecological roles of sharks and the importance that they play to maintain ecosystem stability.