

ESTIMATING ABUNDANCE OF PELAGIC FISHES USING GILLNET CATCH DATA IN DATA-LIMITED FISHERIES: A BAYESIAN APPROACH

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We describe a Bayesian modelling approach to estimate abundance, and biomass, of pelagic fishes from gillnet catches in data-limited situations. By making a number of simple assumptions, we use fish sustained swimming speed to calculate the effective area fished by a gillnet in a specified soak time in order to estimate abundance (fish km⁻²) from the number of fish caught. We used catch data from various sampling methods in northern Australia and elicited anecdotal information from experts to build a size distribution of the true population in order to compensate for size classes that were unlikely to be represented in the catch due to size selectivity of the gear. Our final abundance estimates for various sized tunas and mackerels (0.04 to 4.17 fish km⁻²) and billfishes (0.004 to 0.005 fish per km⁻²) were similar to what has been estimated for tropical ecosystems elsewhere in data-rich situations. The model is particularly useful in data-limited situations where abundance or biomass estimates are required for pelagic fish species of low economic importance. These data are often required for ecosystem models (e.g. Ecopath) which are increasingly being used as tools worldwide for ecosystem-based fisheries management.