

Sea Surface Temperature and Climatic Variables as Drivers of North Pacific Albacore Tuna *Thunnus Alalunga* Time Series

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Abstract : Albacore tuna (*Thunnus alalunga*) is one of the commercially important species of tuna in the North Pacific region. Despite the long history of albacore fisheries in the Pacific, its ecological characteristics are not sufficiently understood. The effects of changing climate on numerous commercially and ecologically important fish species including albacore tuna have been documented over the past decades. The objective of this study was to explore and elucidate the relationship of environmental variables with the stock parameters of albacore tuna. The relationship of the North Pacific albacore tuna recruitment (R), spawning stock biomass (SSB) and recruits per spawning biomass (RPS) from 1970 to 2012 with the environmental factors of sea surface temperature (SST), Pacific decadal oscillation (PDO), El Niño southern oscillation (ENSO) and Pacific warm pool index (PWI) was construed. SST and PDO were used as independent variables with SSB to construct stock reproduction models for R and RPS as they showed most significant relationship with the dependent variables. ENSO and PWI were excluded due to collinearity effects with SST and PDO. Model selections were based on R² values, Akaike Information Criterion (AIC) and significant parameter estimates at $p < 0.05$. Models with single independent variables of SST, PDO, ENSO and PWI were also constructed to illuminate their individual effect on albacore R and RPS. From the results it can be said that SST and PDO resulted in the most significant models for reproducing North Pacific albacore tuna R and RPS time series. SST has the highest impact on albacore R and RPS when comparing models with single environmental variables. It is important for fishery managers and decision makers to incorporate the findings into their albacore tuna management plans for the North Pacific Oceanic region.

Keywords : Albacore tuna, El Niño southern oscillation, Pacific decadal oscillation, sea surface temperature

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