Population Dynamics and Assessment of Skipjack Tuna (*Katsuwonus pelamis*) in the Maldives

by

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ABSTRACT

The tuna fishery of the Maldives, which has been in existence for hundreds of years, is of immense importance to the Maldives in terms of providing food, employment and export earnings. The catch rates of the main species, skipjack tuna (*Katsuwonus pelamis*), representing over 75% of the catch, have been declining since the 1990s.

The main aim of the study was to increase understanding of skipjack tuna population dynamics and to carry out a stock assessment and evaluation of the fishery to provide management advice. Maldivian catch/effort and tagging data were the main types of data used in the analyses.

New estimates of von Bertalanffy growth parameters were obtained, for the first time, from tagging data. A spatially aggregated tag attrition model suggested that the fishery is lightly exploited. However, the highly uncertain nature of the estimates of mortality rates makes this conclusion uncertain. The effects of El Niño and La Niña years, in decreasing and increasing the catch rates respectively, were shown to be statistically significant. Skipjack movements were found to be complex, with some degree of east-west movement related to surface currents and the monsoon seasons. The interaction between the Maldivian fishery and the rest of the Indian Ocean fisheries appears to be small.

A fishery stock assessment using a surplus production model and assuming a closed population within Maldivian waters indicated that the stock was fully exploited. A decision analysis of effort control policies using alternative hypotheses about the per capita rate of increase in the population, estimated from fecundity-at-length data using demographic analysis, showed a 10% reduction in nominal effort may be necessary to bring the stock to higher levels over a five-year time period. Recommendations were made to put in place a strategic fishery development and management plan with elements of passive control.