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**Influence of oceanographic variability on recruitment of yellowfin tuna
Thunnus albacares in the western and central Pacific Ocean**

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**Influence of oceanographic variability on recruitment of yellowfin
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Langley et al.: Yellowfin recruitment in the WCPO

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ABSTRACT

Recruitment estimates for yellowfin tuna in the western and central Pacific Ocean (WCPO), derived from a stock assessment model, are highly variable seasonally, inter-annually and over decadal periods. A generalised linear model (GLM) was developed that predicts the variation in yellowfin recruitment in response to a range of oceanographic variables, computed from different areas and both spatial and temporal scales. The final model accounted for 68% of observed variation in quarterly recruitment for the period 1980–2003, with the inclusion of 10 different oceanographic variables derived from two zones within the equatorial region of the WCPO. The robustness of the recruitment model was investigated by cross-validation. The model was then applied to hindcast recruitment for the period 1952–1979. Recruitment predictions from the GLM closely followed trends in recruitment estimates from the assessment model through most of this period. The long-term trend in predicted recruitment was largely driven by sea surface temperature in the northwestern area of the equatorial region. Likely explanations for deviations between recruitment predictions and recruitment estimates for the initial years of the series are discussed. This work has direct application to stock assessment for yellowfin tuna in the WCPO. Principally, the GLM enables recent (last 1–2 yr) recruitment to be estimated more precisely, thereby increasing the precision of estimates of current biomass and exploitation rates. Increased precision of the current age structure of the population also improves the accuracy of short-term (next 1–2 yr) stock projections from the assessment model. In a broader context, the recruitment model provides a tool to investigate how yellowfin recruitment may change in response to short- and long-term variation in the oceanographic conditions of the WCPO.

KEY WORDS: Yellowfin tuna, *Thunnus albacares*, Recruitment, Oceanography, Pacific Ocean