

Title: **A Bioeconomic Model using a Stage Population Matrix for the Northern Prawn Fishery in Australia**

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Abstract: The Northern Prawn Fishery is one of the most valuable fisheries in Australia with a yearly estimated value of production of about \$64mil. Nine prawn species are commercially harvested from the Northern Prawn Fishery with 80% of annual average catch represented by the banana prawn (*Fenneropenaeus merguensis*) and the tiger prawns (*Penaeus esculentus* and *Penaeus semisulcatus*). The biological complexity of this multi-species fishery affects the ability of management to predict stock levels and consequently to set economically sustainable harvest levels. The model developed here suggests optimal management strategies using a stage population matrix to estimate prawn abundance as a function of catch and effort registered in previous years. Coefficients are parameterized for each species. The bioeconomic model provides a simplified approach for regulating the fishery based on the current resources and constraints, and determines economic optimal levels of future harvest under a sustainable strategy.