Title: **The Fleet Dynamics Component of the Mnl Markov and Sur Markov Models of Managing Australia's Northern Prawn Fishery (Npf)**

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Abstract: The motivation of this paper is to detail the application of Markov chains in simulating fleet dynamics in Australia's Northern Prawn Fishery (NPF). The Markov chains are enhanced through the use of the multinomial logit (MNL) and Seemingly Unrelated Regressions (SUR) models to explain transition probabilities. The terms MNL Markov and SUR Markov are coined, therefore. The MNL Markov and the SUR Markov are novel, as they describe, capture and forecast time-variant (time-inhomogeneous) and time-invariant (time-homogeneous) fleet dynamics within any defined spatial fishery structure. The models yield reliable forecasts, when applied to data-rich fisheries and have a potential of yielding similar forecasts when customised for use in data-poor fisheries. In the paper, the theoretical structure of the MNL Markov and SUR Markov is shown. Results using data from the NPF are provided, and forecasts of reliability are presented. These forecasts can form the pillar of any fishery management strategy evaluation. The two models are novel, and offer a lot of possibilities for answering marine resource use questions with respect to the allocation of fisheries resources. The models represent a unique, simple, effective and novel approach to fishery management, and particularly for understanding the key drivers of effort allocation in fisheries. The original structure of these models is described in detail in Ngwenya (1997), and in an unpublished PhD thesis (Ngwenya, 2001). The MNL Markov and SUR Markov provide a practical way of integrating multiple fisheries objectives, and using economic drivers of fleet dynamics to manage outcomes of a commercial fishery.