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Theme: Special Sessions

Session: ThG1 - Ocean management 3

Title: **Is fishing compatible with environmental conservation: A stochastic model with an element of self-protection.**

Author(s): Dominique Ami , Nadine Hilgert , Sophie Pardo , Mabel Tidball

Abstract: The optimal economic exploitation of renewable resources has been a subject of great interest in the last few decades. Nevertheless many fish stocks have been damaged in such a way that economical exploitation is jeopardized or even interrupted. Consequently, an increasing number of fisheries are collapsing. Causes that are frequently put forward include fishery overcapitalization, habitat destruction and excessive harvest. In the present work, we study the impact of fishing activity on the marine ecosystem and on stock variability. We define fishing not only through annual harvest, but also through a second component, called the degree of protection of the fishery environment. This characterizes the environmental impact of fishing. A stochastic dynamic programming problem is presented in infinite horizon, where a sole owner seeks to maximize a discounted expected profit. We assume a stochastic stock-recruitment relationship where both components of the fishing activity have an impact on the probability law of the state of the fishery environment. We characterize the optimal fishing policy and we compare it with standard models. We find that the optimal policy is not a constant escapement policy and indicates an element of self-protection by the fishery manager. Finally, we are able to analyse the influence of the degree of protection of the fishery environment on environmental conservation (in terms of resource sustainability) and on economic activity.