

Title: **A Bioeconomic Model of Fishery-Habitat Impacts**

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Abstract: A scientific knowledge gap exists with regard to how benthic habitat is affected by destructive fishing methods, such as bottom trawling, and how this impacts upon the productivity of commercial fish stocks. This article addresses analytically the effects of destructive fishing practices of a single gear fishery on a non-renewable habitat, such as deepwater corals, by deriving bioeconomic optimal steady states in the case a habitat is preferred and in the case it is essential. We show that a preferred habitat implies successively higher optimal levels of a commercially harvested renewable deepwater fish species are required to compensate for rising unit harvest costs as the deepwater coral stock is irreversibly depleted, while an essential habitat can lead to the opposite, i.e. a lower input of habitat reduces the optimal stock level. The results are then discussed in the context of spatial protection vs. market-based options focusing on the compatibility between economic efficiency and deepwater conservation goals.