Search and Destroy: a Bioeconomic Model of Orange Roughly Fisheries in New Zealand

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Abstract

This paper reviews New Zealand, orange roughly fishery management and applies a bioeconomic model to explain the seamount depletion externality by bottom trawling. The model shows that despite an upper limit on annual harvest, the potential gains in economic rent from trawling on pristine habitat, where catch rates are high, rather than on known tracks/flat bottom lead to the continued discovery and destruction of seamounts. The bioeconomic model identifies the temporal and spatial determinants of fisher behavior, which we estimate empirically with data on orange roughly catch and effort by location between 2001 and 2010. We find that the probability of seamount discovery and the interest rate are dominant factors in determining the distribution of orange roughly harvest during the fishing year, while the effects of cost of harvest and price are negligible. A amount fee approach may address the spatial dimension of fisher behavior more effectively than current regulation by removing the superior rents associated with pristine seamounts. In the long term, it may provide an impetus for fishers to develop and adopt selective fishing practices. Our analysis emphasizes the importance of understanding underlying economic incentives that govern fisher behavior when devising fish and habitat management.